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Distribution and Abundance of Fish in the Yakima River, Wash., April 1957 to May 1958

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Distribution and Abundance of Fish in the Yakima River, Wash., April 1957 to May 1958

By

BENJAMIN G. PATTEN, RICHARD B. THOMPSON,
and
WILLIAM D. GRONLUND

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By

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ABSTRACT

Fish were collected from the main stem (lower 281 km.) of the river at 2-month intervals. Native fish consisted of six families, with 23 species and three hybrids; exotic fish consisted of five families with 10 species. The water temperature from the mouth of the river to 145 km. upstream was high in summer compared with the stretch between km. 153 and 281. Eleven species were taken principally from the lower 145 km. of the river; 14 other species were taken mostly from the upper area. The greatest numbers of fish were collected from the mouth to km. 64 and from km. 120 to 177. These abundances coincided with centers of abundance of the families Cyprinidae and Catostomidae. Centrarchids were abundant below km. 97, and Cottidae and Salmonidae were most abundant above km. 161. The fewest fish were collected between km. 72 and 89, possibly because of slow current, high summer temperatures, and a muddy bottom. Seasonal distribution and abundance of each species are discussed. Although cyprinids and catostomids were the most abundant fish, salmon (genus Oncorhynchus) and trout (genus Salmo) are the most valuable to man. Trout and juvenile salmon were most common from km. 153 to 281.

INTRODUCTION

The Columbia River drains an extensive area in the Pacific Northwest. Its waters are economically important for electric power (hydroelectric and nuclear plants), agricultural, and fishery uses. Many species of fish are abundant in the drainage and some species, especially salmon, Oncorhynchus spp., support important commercial and sport fisheries. Little is known, however, of the interrelations of the fish of the Columbia River system. This paper contributes to such knowledge by describing the distribution and abundance of fish in a large inland tributary, the Yakima River.

The Yakima River once was an important nursery for fall and spring chinook salmon, O. tshawytscha, and coho salmon, O. kisutch, and is now noted for its sport fishery for rainbow trout, Salmo gairdneri, and mountain whitefish, Prosopium williamsoni. The historic Indian fishery for salmon was also substantial. A decline in the numbers of salmon returning to the Yakima River, first noted by Gilbert and Evermann (1894), was attributed to man's activities. Indeed, O'Malley (1928) reported that unscreened irrigation diversions were responsible for mass destruction of the species. The number of adult salmon entering the Yakima River has been steadily declining in recent years as shown by counts at the Roza Dam near Yakima. Many of the young salmon are lost at dams on their seaward migration (Schoeneman, Pressey, and Junge, 1961), and an intensive fishery on adult fish in the ocean and lower Columbia River reduces the return. The adult fish returning to the Yakima River from the sea are too few to support the Indian fishery and to maintain the stock.

The purpose of this paper is to contribute to knowledge on the distribution and abundance of fish in the part of the Yakima River used by salmon (lower 281 km.), on the effect of water temperature and velocity on their distribution, and on fish that reside with juvenile salmon. Such information leads to a better understanding of elements of the environment that affect the production of young salmon in some tributaries of the Columbia River. This study compliments information by Reimers and Bond (1967) on the distribution of fish in the drainage of the lower Columbia River.

EXPERIMENTAL PROCEDURES

Hydrological features and fish fauna of the Yakima River were examined from April 8, 1957, to May 20, 1958. Seven sampling trips were made at 2-month intervals to collect data at about every 8 km. along the river (fig. 1). Thirty-six sampling sites were predetermined from aerial photographs, but one site (km. 80) was not accessible and was not fished. A complete trip from Easton to the mouth of the river usually took 20 days. The schedule was interrupted on the first trip (April 8 to June 20, 1957) by flooding, which extended the time to over 2 months and prevented sampling at sites at km. 105 and 281.

We used electrofishing gear to collect fish at each site. Collections made on a trip represent an instantaneous sample, and we assume that catches at a site represent the species within an 8-km. section of the river.

The "Type I electric shocker" (Patten and Gillaspie, 1966) was used on the first trip; the more effective "Type II shocker" (Dale, 1959), on other trips. We tried to sample different ecological areas for representative populations at each site. Wading and floating techniques were used. The wading method was effective for collecting small fish that prefer shallows at the stream edge, especially in areas of cover. The floating method, used in deep or swift waters, accounted for most fish

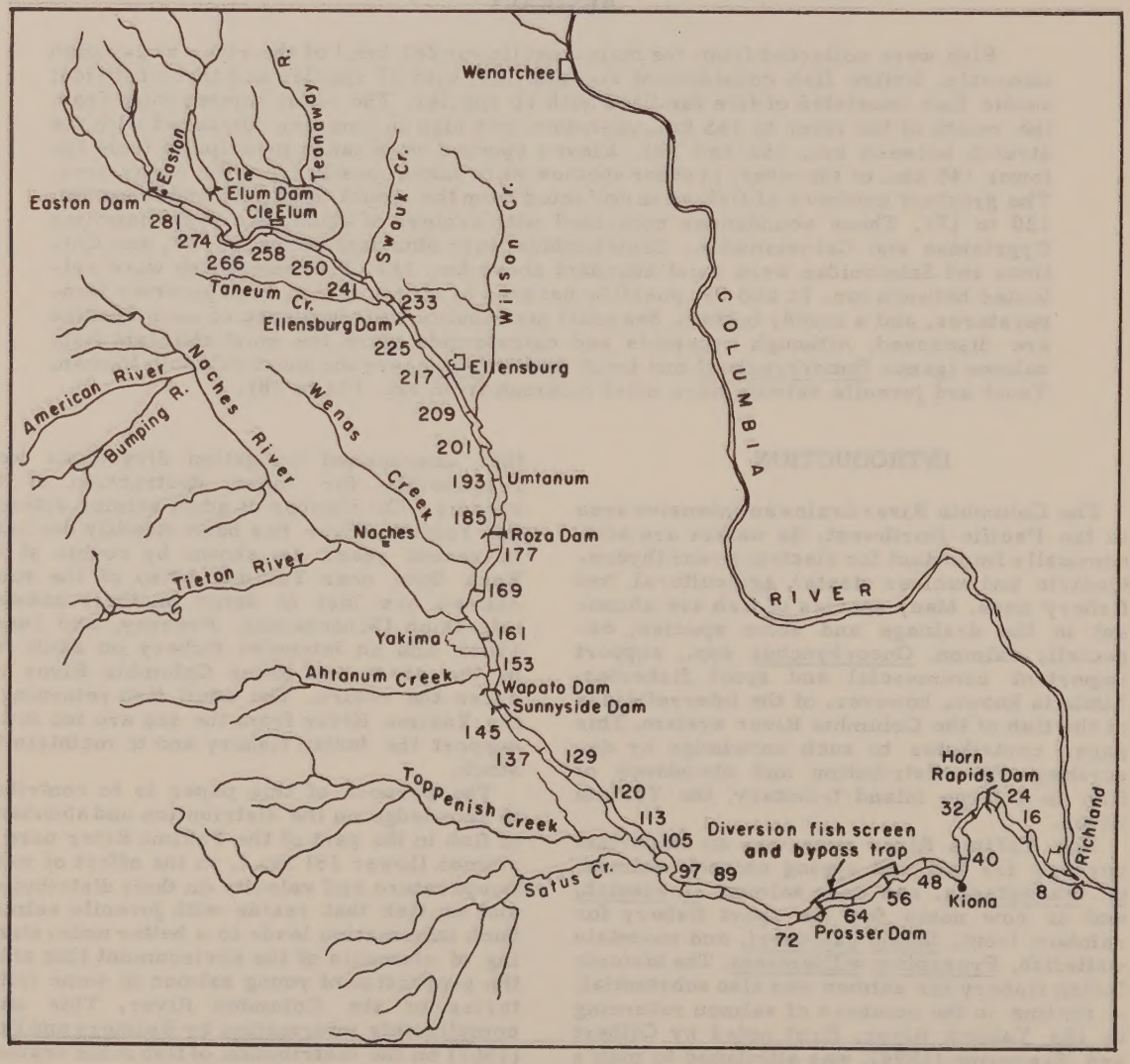


Figure 1.--Sampling sites along the main stem (lower 281 km.) of the Yakima River, by distance (km.) from the mouth of the river.

over 150 mm. long. The cumulative time the electric current passed through the water during sampling was used to calculate CPUE (catch per unit of effort). We calculated the CPUE as the number of fish collected at a site divided by the elapsed sampling time in hundredths of an hour.

Smaller fish, usually those less than 150 mm. long, were preserved in the field and examined later in the laboratory; the larger specimens were processed in the field. The data taken from each fish were species, fork length, weight, sex, gonad development, and stomach contents. The data on each fish were recorded on Hollerith cards. Two species are included in each of the categories of salmon, lamprey, and pumpkinseed. The identifications were not reliable between the juveniles of coho salmon and chinook salmon; between western brook lamprey, Lampetra richardsoni, and Pacific lamprey, L. tridentata; and between pumpkinseed, Lepomis gibbosus, and bluegill, L. macrochirus.

Temperature, resistivity, and turbidity were recorded at each sampling, partly to judge effects on the efficiency of electrofishing. Water temperatures were highest in the late spring, summer, and early fall and usually increased with distance downstream (fig. 2). Temperature affects electrofishing to some degree, but the effect appeared to be insignificant in this study. Water resistivity readings progressively decreased downstream and did not vary greatly at a specific location throughout the year (fig. 3). The lower readings indicate higher concentrations of ions, which increase efficiency in electrofishing. Low resistivity readings also indicate richer waters (McFadden and Cooper, 1962). Turbidity, which was measured by a platinum wire method (Welch, 1948), fluctuated considerably between sampling trips and sites (fig. 4). We had difficulty in seeing shocked fish when visibility was less than 35 cm.

On some trips, conditions such as rain, snow, wind, low intensity of light, and ice also hampered our observations of fish. Although these conditions may have biased our results toward smaller catches of fish, CPUE could not be accurately corrected.

The development of fish fauna has probably been influenced by the geological history of the region. The Yakima River, in west central Washington, drains the east slope of the Cascade Mountains and empties into the Columbia River about 480 km. from the sea. The lower Yakima River was not covered by ice during the last major glaciation during the Pleistocene era (Flint, 1957). The Cascade Mountains had valley glaciers, but the Piedmont ice sheet barely reached the Columbia Plateau, well above the lower Yakima River.

The geography of the watershed varies considerably. The Yakima River flows through three valleys, separated by mountainous ridges. The river flows through deep canyons between km. 250 to 233 and 217 to 177 and

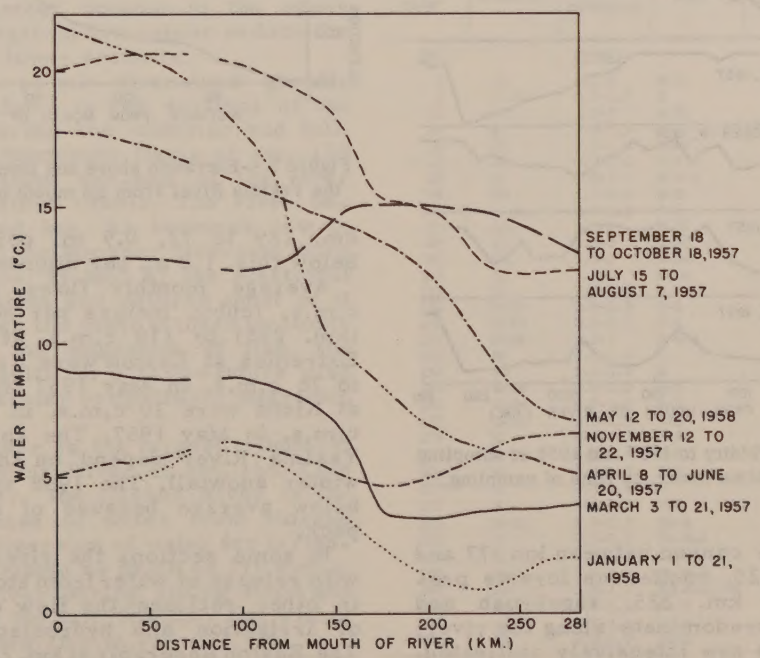


Figure 2.--Water temperatures in 1957 and 1958 at sampling sites along the Yakima River, by time of sampling.

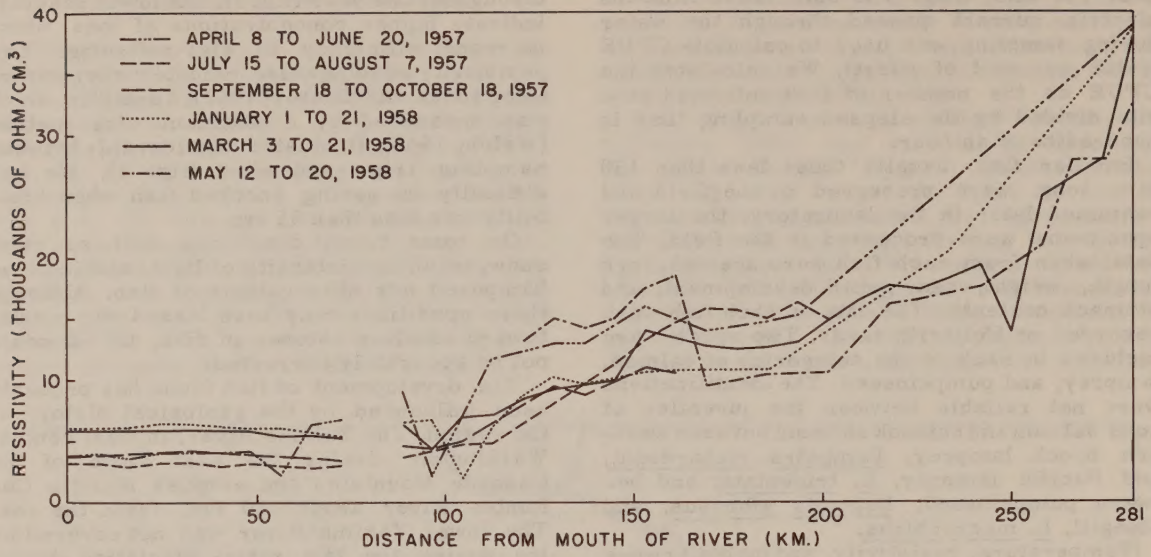

APRIL 8 TO JUNE 20, 1957
JULY 15 TO AUGUST 7, 1957
SEPTEMBER 18 TO OCTOBER 18, 1957
JANUARY 1 TO 21, 1958
MARCH 3 TO 21, 1958
MAY 12 TO 20, 1958
RESISTIVITY (THOUSANDS OF OHM/CM.³)
DISTANCE FROM MOUTH OF RIVER (KM.)

Figure 3.--Water resistivity in 1957 and 1958 at sampling sites along the Yakima River, by time of sampling.

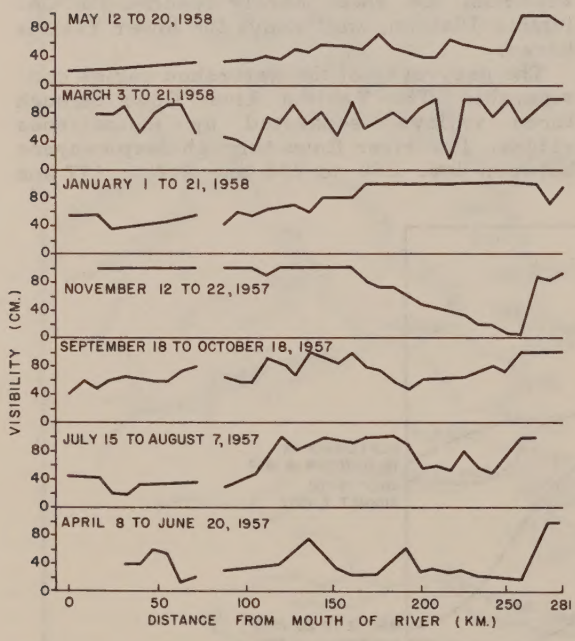

MAY 12 TO 20, 1958
MARCH 3 TO 21, 1958
JANUARY 1 TO 21, 1958
NOVEMBER 12 TO 22, 1957
SEPTEMBER 18 TO OCTOBER 18, 1957
JULY 15 TO AUGUST 7, 1957
APRIL 8 TO JUNE 20, 1957
VISIBILITY (CM.)
DISTANCE FROM MOUTH OF RIVER (KM.)

Figure 4.--Water turbidity in 1957 and 1958 at sampling sites along the Yakima River, by time of sampling.

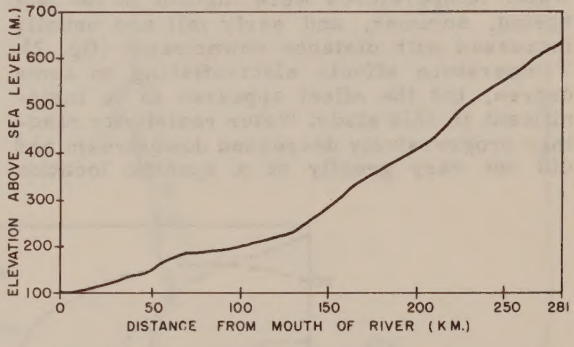


Figure 5.--Elevation above sea level of the main stem of the Yakima River from its mouth to 281 km. upstream.

through a shallow canyon between km. 77 and 56. Above km. 225, coniferous forests predominate; below km. 225, sagebrush and deciduous trees predominate along the river. The wide valleys are intensively cultivated. The elevation is from 640 m. at km. 281 to 96 m. at the mouth (fig. 5). Above km. 129, the river drops 2.8 m. per kilometer; from km. 129 to 72, 0.9 m. per kilometer; and below this, 1.0 m. per kilometer.

Average monthly flows ranged from 42 c.m.s. (cubic meters per second) at Easton (km. 286) to 110 c.m.s. at Kiona (km. 43). Extremes at Easton were 1 c.m.s. in October to 76 c.m.s. in May 1957 (fig. 6). Extremes at Kiona were 30 c.m.s. in June 1957 to 547 c.m.s. in May 1957. The spring floods in the Yakima River depend on the melting of the winter snowfall. The 1958 spring runoff was below average because of a reduced snowpack.

In some sections the river flow increases with release of water from storage reservoirs; in other sections the flow declines because of irrigation and hydroelectric diversions. The Easton Reservoir at km. 286, the Keechelus Lake and Kachess Lake Reservoirs, above km. 286, and the Cle Elum Lake Reservoir store water during the winter and spring and

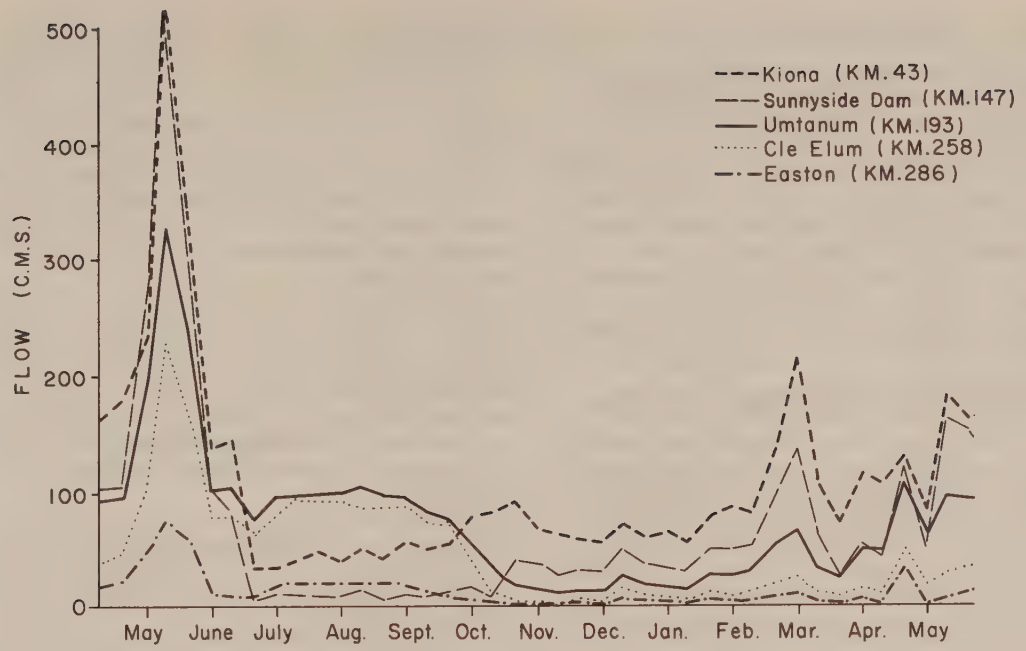


Figure 6.--Monthly flow of the Yakima River at Kiona, Sunnyside Dam, Umtanum, Cle Elum, and Easton, May 1957 to May 1958.

supplement the river flow for irrigation in the summer. During the spring and summer irrigation season, water releases maintain a greater than normal volume in the upper reaches, and irrigation diversions reduce the volume of flow in lower sections.

Irrigation and power diversions greatly reduce water volume in two sections of the Yakima River during the summer and fall. The Wapato and Sunnyside Dams at km. 150 and 146 divert about one-half of the river water into irrigation canals. The river between km. 67 and km. 53 becomes low in summer and fall; the Prosser diversion ditch removes 42 c.m.s. at km. 67 for electrical power and irrigation and returns most of it at km. 53. Although the depth at these locations is adequate for the migration of fish, the reduced flow results in a temperature rise that creates a barrier to upstream migration of salmon.

The Naches River is the largest tributary; it enters the Yakima River at km. 165. Like the Yakima River, the Naches River is influenced by release of water from storage reservoirs and diversion of water for irrigation. It may contribute as much as 170 c.m.s. to the Yakima River during spring flood and 57 c.m.s. during the fall. Summer and winter flows average below 28 c.m.s.

Bryant and Parkhurst (1950) described in detail the features of the river and the sites used by salmon for spawning. Table 1 gives the general features at our sampling sites.

Table 1.--Hydrology and other characteristics of the Yakima River at sampling sites along the main stem in 1957 and 1958

Location of site[1]	Water velocity[2]	Average depth in midstream	Bottom type[3]	Amount of aquatic vegetation[4]	Amount of shade[5]	Average width
Km.		Meters				Meters
0	Sl	1.5-3	M-Sa	N	N	91
8	Sl-M	0.9-1.5	G	N	P	60
16	Sl	1.5-3	M-Sa	N	N	30
24	M	0.9-1.5	R-B	N	N	105
32	Sl	0.9-1.5	Sa-R	N	N	120
40	Sw	0.9-1.5	R-B	N	P	27
48	M	0.9-1.5	M-R-B	N	N	85
56	Sw	1.3-2.4	R-B	N	N	80
64	M-Sw	0.9-1.5	R-B	M	P	80
72	Sl	1.5-3	M-Si	N	N	130
89	Sl	1.5-3	M-Sa	N	N	95
97	Sl	1.5-3	M-Sa	N	N	73
105	Sl	1.5-3	M-Sa	N	N	67
113	M	1.3-2.4	G	N	P	52
120	M-Sw	0.9-1.5	G-R	N	P	58
129	M-Sw	0.9-1.5	G-R	N	P	33
137	M-Sw	1.5-3	M-G-R	N	P	36
145	M	0.9-1.5	G	N-M	N	55
153	Sw	0.9-1.5	R	N	P	36
161	M-Sw	0.9-1.5	M-G	N	P	55
169	M-Sw	0.9-1.5	G-R	N	P	52
177	M-Sw	0.6-1.3	G-R	N	N	76
185	M	0.6-1.3	R-B	N	P	55
193	M-Sw	1.2-2.4	R-B	N	N	48
201	M	0.9-1.5	R-B	N	N	48
209	M	0.9-1.5	R	N	P	36
217	M	0.6-1.3	M-R	M	P	45
225	M-Sw	0.9-1.5	Sa-R	N	N	48
233	M	0.6-1.3	Sa-G-R	N	P	55
241	M	0.6-1.3	R-B	N	N	55
250	Sw	0.6-1.3	Sa-R-B	N	N	55
258	Sw	0.6-1.3	Si(coal)-R	N	P	36
266	Sw	0.6-1.3	Sa-R	N	P	27
274	Sw	0.6-1.3	Sa-R	N-M	P	15
281	Sw	0.3-0.9	Sa-R	N-M	P	12

[1] Distance upstream from the mouth of the river.
[2] M - Moderate, Sl - Sluggish, Sw - Swift.
[3] B - Boulders, G - Gravel, M - Mud, R - Rubble, Sa - Sand, Si - Silt.
[4] M - Minor, N - None.
[5] N - None, P - Patchy.

FISH FAUNA

Included in this section are the names of the species taken in the river and data on the general and seasonal distribution and abundance of the species. The fish species and estimates of their distribution and abundance are based on a collection of 34,733 fish. The abundant forms in the catches were represented by specimens of all life stages, except for the adults of salmon and Pacific lamprey. The appendix presents the catch per unit of effort and numbers of fish by site and date of sampling.

Names and Numbers of Families and Species

Thirty-three species and three hybrids were collected (table 2). Species of fish previously taken from the Yakima River drainage but not collected in this study include: shorthead sculpin, tui chub, burbot, kokanee, the lacustrine form of sockeye salmon, and white sturgeon. The burbot probably migrated downstream from reservoirs in the headwaters, and the white sturgeon had probably moved upstream from the Columbia River. Sockeye salmon runs in lakes of the Yakima River drainage were destroyed by the construction of dams on Lakes Keechelus, Kachess, Cle Elum, and Bumping (Naches River system) before 1911. Kokanee in the reservoirs behind these dams produce a few fish that migrate downstream presumably on their way to the sea in the spring.

Table 2.--Names of fish species and hybrids collected from the main stem of the Yakima River, April 1957 to May 1958

Family and common name	Scientific name
Petromyzontidae:	
Western brook lamprey	Lampetra richardsoni
Pacific lamprey	Lampetra tridentata
Salmonidae:	
Coho salmon	Oncorhynchus kisutch
Chinook salmon	O. tshawytscha
Mountain whitefish	Prosopium williamsoni
Cutthroat trout	Salmo clarki
Rainbow trout (steelhead)	S. gairdneri
Brown trout	S. trutta
Brook trout	Salvelinus fontinalis
Dolly Varden	S. malma
Cyprinidae:	
Chiselmouth	Acrocheilus alutaceus
Carp	Cyprinus carpio
Peamouth	Mylocheilus caurinus
Northern squawfish	Ptychocheilus oregonensis
Longnose dace	Rhinichthys cataractae
Leopard dace	R. falcatus
Speckled dace	R. osculus
Redside shiner	Richardsonius balteatus
Chiselmouth x northern squawfish, hybrid	----------
Speckled dace x redside shiner, hybrid	----------
Catostomidae:	
Bridgelip sucker	Catostomus columbianus
Largescale sucker	C. macrocheilus
Mountain sucker	Pantosteus platyrhynchus
Bridgelip sucker x largescale sucker, hybrid	----------
Ictaluridae:	
Black bullhead	Ictalurus melas
Percopsidae:	
Sand roller	Percopsis transmontana
Centrarchidae:	
Pumpkinseed	Lepomis gibbosus
Bluegill	L. macrochirus
Smallmouth bass	Micropterus dolomieui
Largemouth bass	M. salmoides
Black crappie	Pomoxis nigromaculatus
Percidae:	
Yellow perch	Perca flavescens
Cottidae:	
Prickly sculpin	Cottus asper
Mottled sculpin	C. bairdi
Piute sculpin	C. beldingi
Torrent sculpin	C. rhotheus

The fish fauna of the Yakima River includes 28 native species and the following 10 exotic species: brown trout, brook trout, carp, black bullhead, pumpkinseed, bluegill, smallmouth bass, largemouth bass, black crappie, and yellow perch. The native species belong to families: Petromyzontidae, Salmonidae, Cyprinidae, Catostomidae, Percopsidae, and Cottidae.

From April 8, 1957, to May 20, 1958, the total number of species ranged from 11 at km. 72 to 20 at km. 161 and 169 (fig. 7), and the average number per collection at the various sites ranged from 4.7 at km. 72 to 13.1 at km. 217 (fig. 8); the grand average was 8.7.

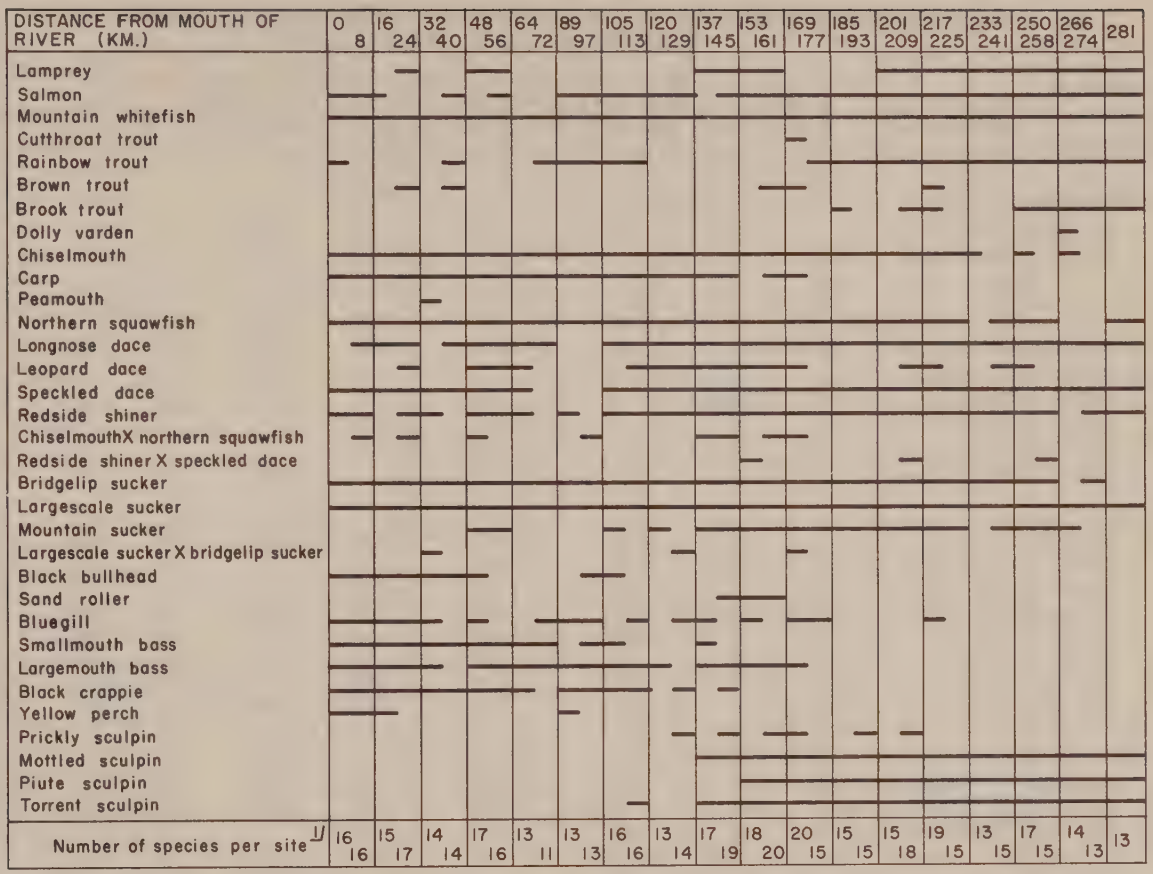
The Yakima River seems to have derived its fish fauna from adjacent areas of the Columbia River drainage. Fish native to the Columbia River watershed but not recorded from the Yakima River are: threespine stickleback, Gasterosteus aculeatus,[1] slimy sculpin, Cottus cognatus, reported by Bailey and Bond (1963); and Shoshone sculpin, Cottus greenei, Wood River sculpin, Cottus leiopomus, and margined sculpin, Cottus marginatus, reported by Jordan and Evermann (1898). Species common in the lower Columbia River but absent from the Yakima River are the riffle sculpin, Cottus gulosus, and reticulate sculpin, C. perplexus (Reimers and Bond, 1967).

Man's activities, which have produced waters warmer than previously in the summer below km. 153, undoubtedly have created new ecological niches and destroyed others. Indeed, 10 exotic species have been established without great threat to the existence of native species.

Distribution and Abundance of Fish

Reported in this section are data on the general and seasonal distribution and abundance of fish. The part on general distribution and abundance contains information on the total catch during the study, April 8, 1957, to May 20, 1958. The part on seasonal distribution and abundance summarizes data collected during each of seven sampling trips of the study: April 8 to June 20, 1957; July 15 to August 7, 1957; September 18 to October 18, 1957; November 12-20, 1957; January 1-21, 1958; March 3-20, 1958; and May 12-20, 1958.

[1] Taken by senior author from Rock Island Dam Reservoir, March 8, 1963.



1/ The three hybrids are not included.

Figure 7.--Fish species taken from the main stem of the Yakima River in 1957 and 1958, by sampling site. The presence of a species is indicated by the horizontal bar.

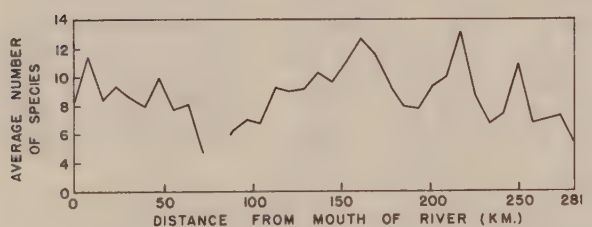


Figure 8.--Average number of fish species taken from each sampling site along the main stem of the Yakima River, May 1957 to May 1958.

General.--Figure 7 shows the distribution of each species. The largescale sucker and mountain whitefish were the only species collected at every station throughout the study area. Anadromous chinook and coho salmon and steelhead trout that were caught at km. 281 must have passed through the entire study area. Species collected from at least 30 of the 35 sampling sites include the bridgelip sucker, chiselmouth, northern squawfish, redside shiner, longnose dace, and speckled dace.

The abundance of a species is shown in tables 3 and 4. By family, the five most abundant groups of fish by diminishing order were Cyprinidae, Catostomidae, Salmonidae, Cottidae, and Centrarchidae (figure 9). The Cyprinidae and Catostomidae were most abundant at km. 0 to 72, 97 to 185, and 209 to 225. Salmonidae were relatively few in the lower Yakima River but were generally co-dominant with Cottidae above km. 177. Centrarchidae were most abundant below km. 56.

Seasonal.--The seasonal distribution and abundance of the species were as follows:

Western brook and Pacific lampreys (combined, 21[2])

Normal range: Km. 153 to 274 (fig. 10, table A-1).

[2] Number designates rank (1-29) in abundance among fishes of the Yakima River.

Table 3.--Catches of fish from the main stem of the Yakima River, by species and sampling dates in 1957-58

Family and common name	Apr. 8-June 20	July 15-Aug. 7	Sept. 18-Oct. 18	Nov. 12-22	Jan. 1-21	Mar. 3-20	May 12-20	Total
				Number				
Petromyzontidae								
W. brook lamprey Pacific lamprey	9	31	31	22	28	11	14	146
Salmonidae:								
Salmon, coho + chinook.	63	39	65	259	153	351	434	1,364
Mountain whitefish.....	167	96	270	383	255	406	149	1,726
Cutthroat trout.....	0	0	0	3	0	0	0	3
Rainbow trout.....	22	6	12	46	47	41	34	208
Brown trout.....	0	0	0	0	1	1	11	13
Brook trout.....	5	3	0	3	7	9	4	31
Dolly Varden.....	1	0	0	0	0	0	0	1
Cyprinidae:								
Chiselmouth.....	717	560	1,157	794	1,053	1,745	900	6,926
Carp.....	298	233	444	99	79	158	172	1,483
Peamouth.....	1	0	0	0	0	0	0	1
N. squawfish.....	420	257	564	378	393	667	732	3,411
Longnose dace.....	45	268	145	3	6	41	42	550
Leopard dace.....	37	76	49	8	8	28	14	220
Speckled dace.....	559	700	639	367	173	395	523	3,356
Redside shiner.....	678	282	550	609	897	1,133	502	4,651
Castomidae:								
Bridgelip sucker.....	331	195	308	170	153	235	229	1,621
Largescale sucker.....	609	300	528	390	416	628	416	3,287
Mountain sucker.....	6	15	19	5	0	12	71	128
Ictaluridae:								
Black bullhead.....	6	18	2	1	2	17	5	51
Percopsidae:								
Sand roller.....	2	7	8	6	14	10	0	47
Centrarchidae:								
Pumpkinseed + bluegill.	16	37	102	127	6	50	8	346
Smallmouth bass.....	46	66	115	78	44	51	63	463
Largemouth bass.....	22	25	151	47	19	81	43	388
Black crappie.....	119	33	79	35	274	204	124	868
Percidae:								
Yellow perch.....	1	1	3	2	1	4	1	14
Cottidae:								
Prickly sculpin.....	0	2	10	0	2	0	0	14
Mottled sculpin.....	47	61	198	254	102	191	192	1,045
Piute sculpin.....	14	76	29	107	88	95	43	452
Torrent sculpin.....	296	351	384	281	199	222	166	1,899
Hybrids.....	0	0	5	4	3	6	2	20
Total.....	4,538	3,738	5,867	4,481	4,423	6,792	4,894	34,733

Table 4.--Catch per unit of effort[1] of fish from the main stem of the Yakima River, by species and sampling date, 1957-58

Common name	Apr. 18-June 20	July 15-Aug. 7	Sept. 18-Oct. 18	Nov. 12-22	Jan. 1-21	Mar. 3-20	May 12-20	Total	Percentage of total
	Number								
Lamprey	12	30	54	36	48	18	34	232	-
Salmon	72	42	116	514	322	556	946	2,568	4
Mountain whitefish	154	128	494	508	578	750	358	3,368	6
Cutthroat trout			6					6	-
Rainbow trout	22	2	18	108	82	76	76	384	1
Brown trout					2	2	28	32	-
Brook trout	2	4		6	12	16	10	50	-
Dolly varden	2							2	-
Chiselmouth	612	764	1,706	1,584	1,844	3,046	2,338	11,894	20
Carp	302	352	738	194	184	296	500	2,566	4
Peamouth	2							2	-
Northern squawfish	360	330	852	758	696	1,136	2,102	6,234	11
Longnose dace	50	370	204	6	12	66	110	818	1
Leopard dace	32	72	76	16	20	56	48	320	1
Speckled dace	572	804	1,010	644	298	708	1,256	5,292	9
Redside shiner	530	334	798	1,144	1,468	1,796	1,312	7,382	12
Chiselmouth X northern squawfish			4	6	4	12		26	-
Redside shiner X speckled dace			4				2	6	-
Bridgelip sucker	262	218	480	354	310	412	584	2,620	4
Largescale sucker	468	350	808	822	808	1,062	1,074	5,392	9
Mountain sucker	4	16	52	10		22	154	258	-
Largescale sucker X Bridgelip sucker			2		2		2	6	-
Black bullhead	12	40	2	2	4	26	18	104	-
Sand roller	2	10	6	8	14	14		27	-
Pumpkinseed and bluegill	16	52	142	226	16	98	26	576	1
Smallmouth bass	48	98	188	156	68	98	174	830	1
Largemouth bass	26	38	182	98	42	138	174	698	1
Black crappie	166	50	100	68	532	350	376	1,642	3
Yellow perch	2	2	4	4	2	10	4	28	-
Prickly sculpin		2	16		4			22	-
Mottled sculpin	54	52	360	558	202	326	382	1,934	3
Piute sculpin	22	74	46	254	198	162	94	850	1
Torrent sculpin	304	364	568	578	366	364	372	2,916	5
Total	4,110	4,596	9,030	9,068	8,138	11,616	12,554	59,076	

[1] Catch per unit of effort is number of fish taken at a site divided by time of collection in hundredths of hours.

Periods of abundance: Lampreys were most abundant in the winter and least abundant from March to June.

Comments: Lampreys are apparently residents of the upper Yakima. The Pacific lamprey undoubtedly passes through the entire river in its anadromous migration.

Coho and chinook salmon (combined, 10)

Normal range: Km. 153 to 281 (fig. 11, table A-2).

Periods of abundance: Salmon were most abundant from March to May and less numerous from June to October.

Comments: The Yakima River system has runs of coho, spring chinook, and fall chinook salmon (Bryant and Parkhurst, 1950; Fulton, 1968).

The life history of coho and spring chinook salmon in the Yakima River is similar. They spawn in the area above km. 250. Their progeny emerge from the gravel about March, and the

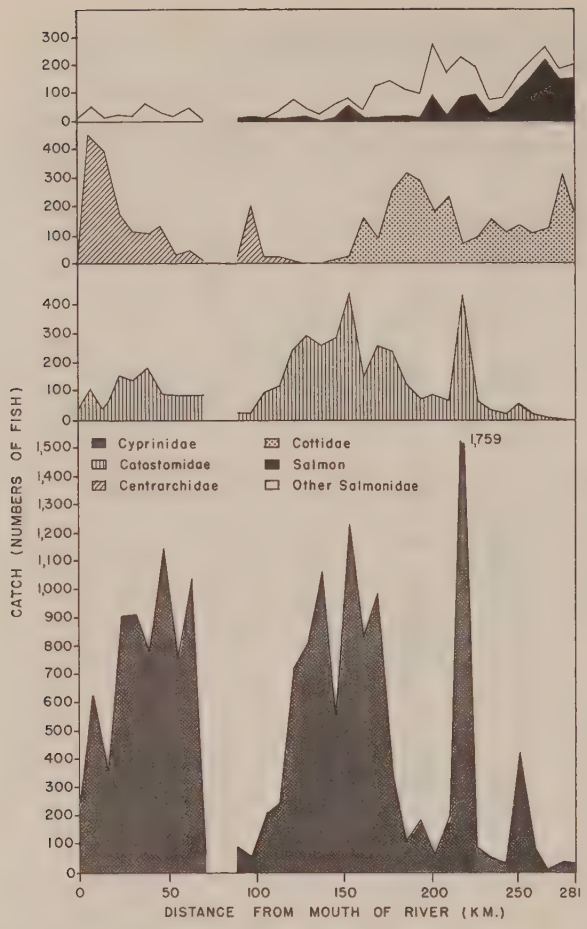


Figure 9.--Total catch of Cyprinidae, Catostomidae, Centrarchidae, Cottidae, and Salmonidae from the main stem of the Yakima River in 1957 and 1958, by sampling site.

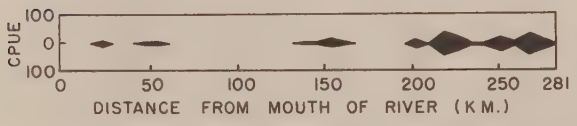


Figure 10.--CPUE (catch per unit of effort) of Pacific and western brook lamprey (combined) from the main stem of the Yakima River in 1957 and 1958, by sampling site.

distribution of the fry slowly expands downstream. By the end of summer the salmon are common to km. 153, but the greater numbers are above km. 201. An active seaward migration begins about February and is completed by June. During March to June the abundance of salmon is increased by the presence of two year classes.

Fall chinook salmon spawn below km. 153, and their progeny move toward the sea shortly after emerging from the gravel. Fall chinook salmon fry probably were not collected in this study.

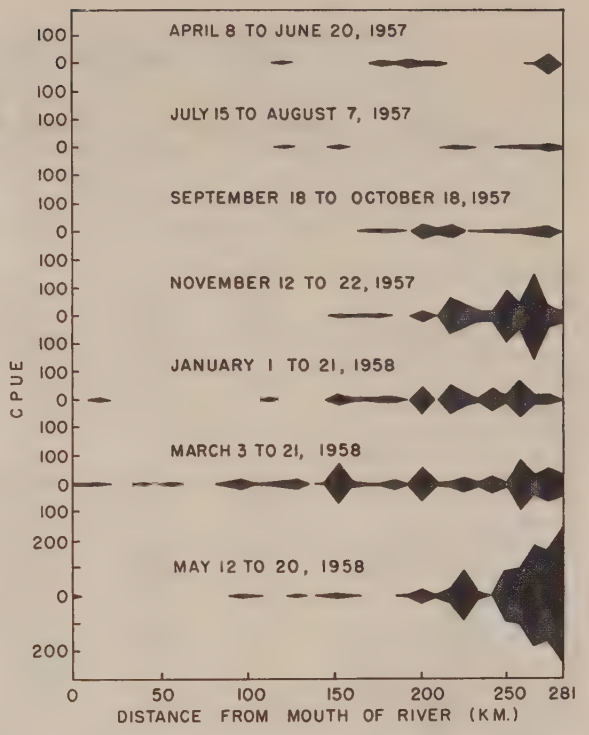

APRIL 8 TO JUNE 20, 1957
JULY 15 TO AUGUST 7, 1957
SEPTEMBER 18 TO OCTOBER 18, 1957
NOVEMBER 12 TO 22, 1957
JANUARY 1 TO 21, 1958
MARCH 3 TO 21, 1958
MAY 12 TO 20, 1958
CPUE
DISTANCE FROM MOUTH OF RIVER (KM.)

Figure 11.--CPUE (catch per unit of effort) of chinook and coho salmon (combined) from the main stem of the Yakima River in 1957 and 1958, by sampling site and date.

The Naches River produces a considerable portion of the salmon of the Yakima watershed. Recent indications are that only spring chinook salmon use the Naches River (Major and Mighell, 1969). Supplemental collections suggest that salmon smolts of the Naches River do not enter the main Yakima River in numbers until January.

Mountain whitefish (6)

Normal range: Km. 0 to 64 and 113 to 258 (fig. 12, table A-3).

Periods of abundance: Mountain whitefish were more abundant from September to March than at other times of the year.

Comments: Shifts in abundance indicate seasonal migrations. In November, the mountain whitefish that were previously abundant between km. 120 and 209 seemed to have moved toward the upper portion of the study area, and the numbers of whitefish from the mouth to km. 72 increased. Because the number of whitefish in the lower river increased at the normal time of spawning and because almost all of

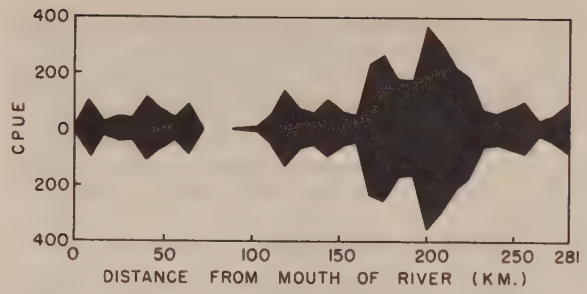


Figure 12.--CPUE (catch per unit of effort) of mountain whitefish from the main stem of the Yakima River in 1957 and 1958, by sampling site.

those caught were mature, this movement was probably a spawning migration. We suspect that the whitefish that spawned in the upper river were residents of the Yakima River and that the population below km. 72 migrated into the Yakima from the Columbia River. The mountain whitefish receded from the upper Yakima by January and from the lower river before May. Collections of yearling whitefish were rare, which is perplexing when the abundance of the adults is considered.

Cutthroat trout (28)

Three were collected at km. 169 in November (fig. 13, table A-4).

Rainbow trout (18)

Normal range: Km. 201 to 281 (fig. 13, table A-5).
Period of abundance: November to May.
Comments: Rainbow trout are represented by resident and anadromous types. Steelhead trout, the anadromous type, move out of the Yakima in the spring. Rainbow trout juveniles taken below km. 177 from March to June probably were steelhead trout smolts.

Brown trout (25)

Brown trout, which have been introduced to provide sport fishing, were taken at km. 24 in January, km. 217 in March, and 40, 161, and 169 in May (fig. 13, table A-6).

Brook trout (23)

Small numbers of brook trout were taken above km. 177 on all but the third (September-October) trip (fig. 13, table A-7). The brook trout is common in irrigation canals in the Ellensburg area but not in the main stem of

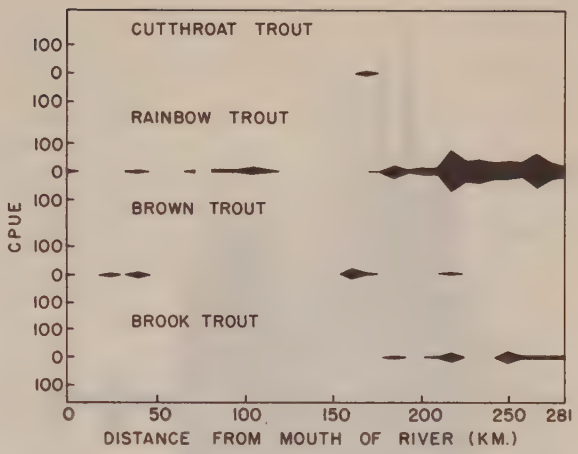


Figure 13.--CPUE (catch per unit of effort) of cutthroat, rainbow, brown and brook trout from the main stem of the Yakima River in 1957 and 1958, by sampling site.

the Yakima River. The brook trout usually were taken near a slough or irrigation water outlet.

Dolly Varden (29)

The single Dolly Varden trout that was collected at km. 266 in April 1957 probably originated in a reservoir above the study area.

Chiselmouth (1)

Normal range: Km. 0 to 169 (fig. 14, table A-8).
Period of abundance: Chiselmouth were most abundant January to May and least abundant July to October.
Comments: The fact that larger numbers of adult chiselmouth were taken in March and May than in other months made us suspect that these adults had moved into the Yakima from the Columbia River on a spawning migration.

Carp (9)

Normal range: Km. 0 to 137 (fig. 15, table A-9).
Comments: Most carp were taken in the lower half of the study area. It was the only abundant species that did not notably avoid the area between km. 72 and 105. Small carp, less than 200 mm. long, were rare. Carp were not taken above km. 169, but a few were observed during other studies in an irrigation canal that enters the Yakima River near km. 217.

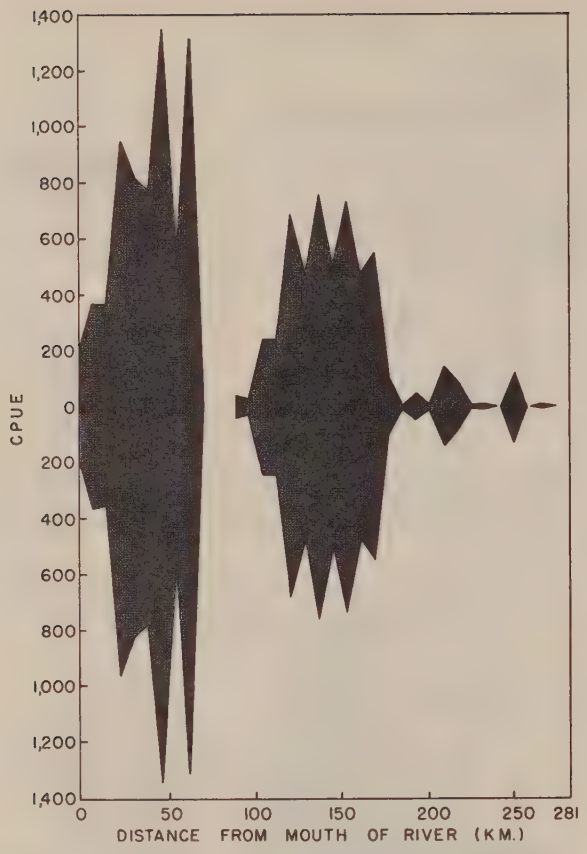


Figure 14.--CPUE (catch per unit of effort) of chiselmouth from the main stem of the Yakima River in 1957 and 1958, by sampling site.

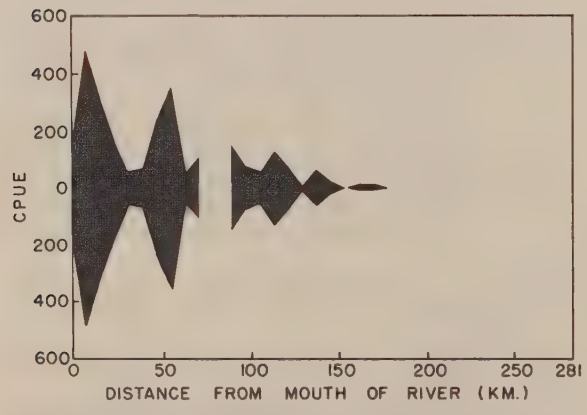


Figure 15.--CPUE (catch per unit of effort) of carp from the main stem of the Yakima River in 1957 and 1958, by sampling site.

Peamouth (29)

The Yakima River is apparently not normally used by the peamouth. In June 1954, three peamouth were collected in a bypass trap operated at the Horn Rapids irrigation diversion dam (km. 27).[3] In the lower Columbia River, large numbers of peamouth ascend tributary streams for short distances on spawning migrations in early June. The single specimen collected at km. 32 in June 1957 may have been a stray.

Northern squawfish (3)

Normal range: Km. 0 to 64 and 113 to 225 (fig. 16, table A-10).

Periods of abundance: The catches of northern squawfish were greatest during May 1958 and smallest in July to October 1957.

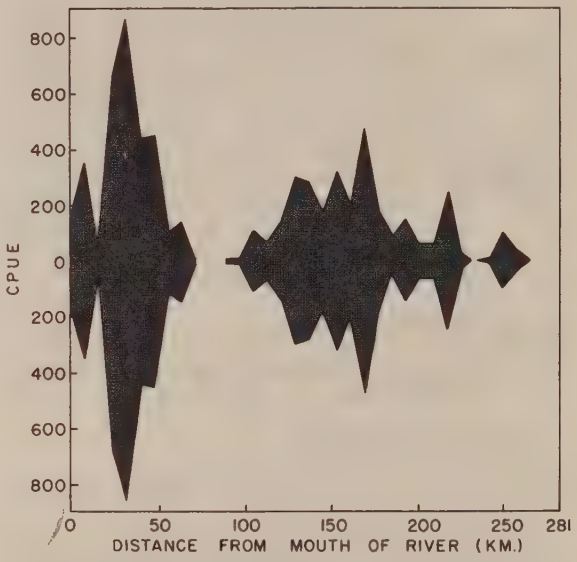


Figure 16.--CPUE (catch per unit of effort) of northern squawfish from the main stem of the Yakima River in 1957 and 1958, by sampling site.

Longnose dace (15)

Normal range: Km. 8 to 64 and 120 to 281 (fig. 17, table A-11).

Periods of abundance: Longnose dace were more abundant from May to October than at other times of the year.

Comments: The numbers of longnose dace sharply decreased from November to March. The more logical causes for this decrease are mortality, migration, or unavailability to the sampling gear. No reasons exist for suspecting a mass mortality or movement; the populations are probably essentially stable. We suggest that the preferred habitat of the longnose dace changes from a swift riffle in the summer and

[3] Richard T. Pressey, Biologist, Wash. Dep. Fish., Olympia, Wash. Unpublished data.

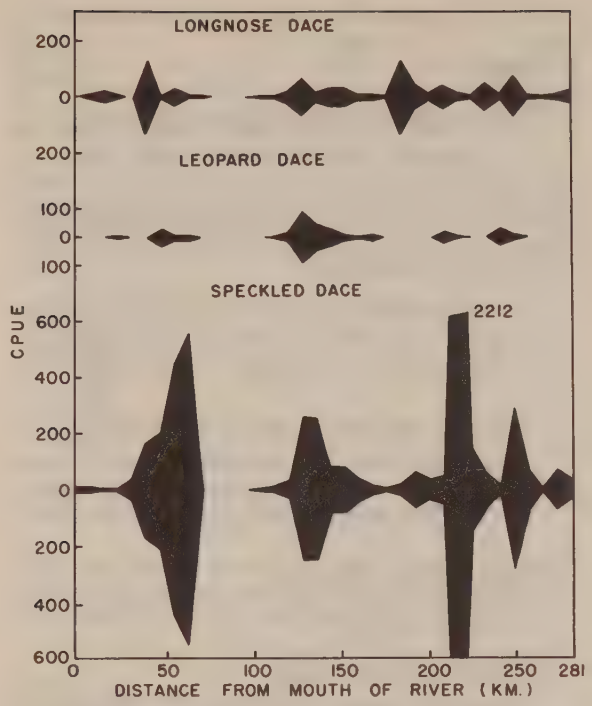


Figure 17.--CPUE (catch per unit of effort) of longnose, leopard, and speckled dace from the main stem of the Yakima River in 1957 and 1958, by sampling site.

fall to a pool in winter. In deeper pools they may not be susceptible to electrofishing.

Leopard dace (19)

Normal range: Km. 120 to 169 (fig. 17, table A-12).

Speckled dace (5)

Normal range: Km. 24 to 80 and 113 to 281 (fig. 17, table A-13).
Centers of abundance: Km. 56, 137, 217, and 250.
Comments: Speckled dace are abundant in the main Yakima River and extremely so in irrigation canals where flows are more moderate and stable. Forty-three percent of all speckled dace were caught in an irrigation outlet at km. 217.

Redside shiner (2)

Normal range: Km. 0 to 32 and 113 to 250 (fig. 18, table A-14).
Centers of abundance: Km. 120 to 177, 217, 225, and 250.
Comments: Redside shiners are abundant in the main Yakima River, especially above km. 120, and extremely numerous in irrigation canals.

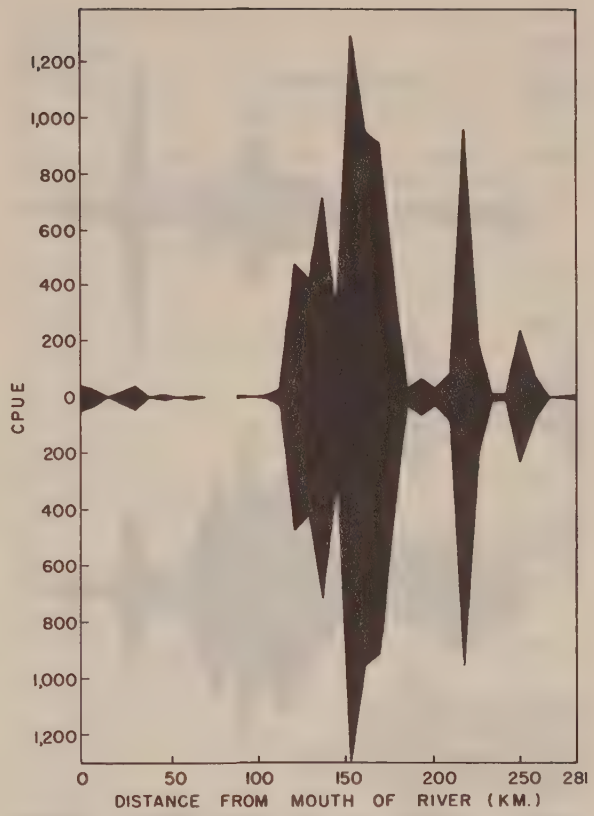


Figure 18.--CPUE (catch per unit of effort) of redside shiner from the main stem of the Yakima River in 1957 and 1958, by sampling site.

Chiselmouth X northern squawfish, hybrid

Small catches were made at km. 169 and below (table A-15). This hybrid was also taken during other studies from an irrigation canal that returns to the river near km. 217 and at the Prosser bypass trap (Patten, 1960).

Redside shiner X speckled dace, hybrid

Individuals of this putative parentage were collected at km. 153, 209, and 258 (table A-16) and were frequently taken during another study in an irrigation canal that returns to the river near km. 217.

Bridgelip sucker (8)

Normal range: Km. 8 to 72 and 113 to 250 (fig. 19, table A-17).

Largescale sucker (4)

Normal range: Km. 0 to 250 (fig. 19, table A-18).
Period of abundance: Some indication of an increase in numbers in the spring.
Comments: In the lower Columbia River during May, largescale suckers migrate

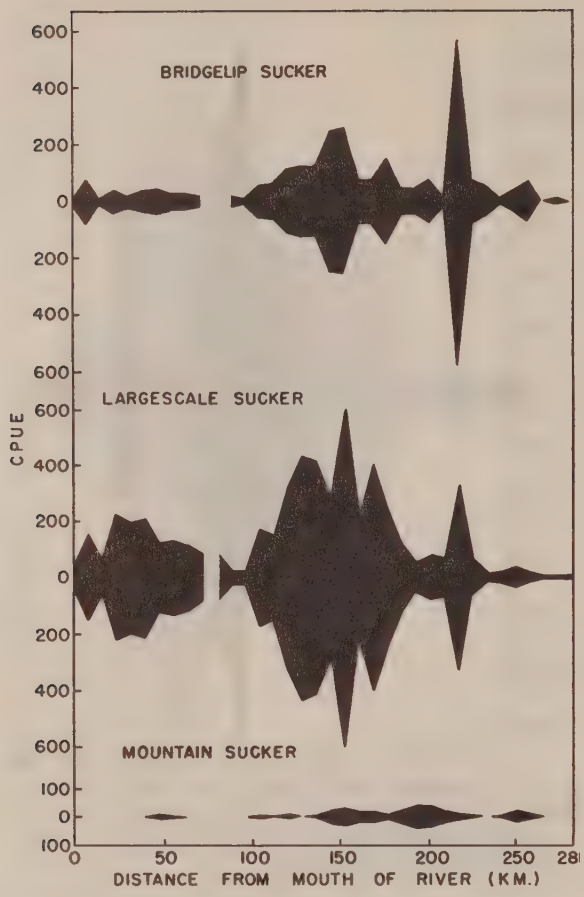


Figure 19.--CPUE (catch per unit of effort) of bridgelip, largescale, and mountain sucker from the main stem of the Yakima River in 1957 and 1958, by sampling site.

into some tributary streams to spawn; however, spawning migrations could not be detected in the Yakima River.

Mountain sucker (20)

Small numbers of mountain sucker were taken predominantly between km. 153 and 250 (fig. 19; table A-19).

Largescale sucker X bridgelip sucker, hybrid

Individuals suspected to be of this parentage were collected at km. 32, 129, and 169 (table A-20).

Black bullhead (22)

Small numbers of black bullhead were taken between km. 0 and 105 (fig. 20, table A-21), usually in areas with mud bottom and low water velocity.

Sand roller (23)

Sand rollers were consistently taken between km. 145 and 161 (fig. 21, table

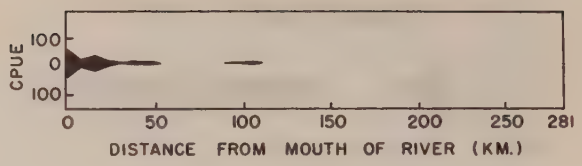


Figure 20.--CPUE (catch per unit of effort) of black bullhead from the main stem of the Yakima River in 1957 and 1958, by sampling site.

A-22), and a few were collected during other studies in an irrigation canal that returns to the Yakima River near km. 217.

Bluegill and pumpkinseed (combined, 17)

Bluegill and pumpkinseed were found below km. 217 in areas with low water velocity and at km. 8 (fig. 22, table A-23).

Smallmouth bass (14)

Normal range: Km. 0 to 64 (fig. 23, table A-24).

Largemouth bass (16)

Normal range: Km. 0 to 16, and 97 to 113 (fig. 23, table A-25).

Black crappie (12)

Normal range: Km. 0 to 48 and 89 to 113 (fig. 24, table A-26).
Periods of abundance: The greater catches were made from January to May 1958.
Comments: Black crappies were usually found in schools in areas with heavy cover along the banks of the stream.

Yellow perch (26)

Yellow perch were taken at km. 89 and 0 to 16 (fig. 25, table A-27).

Prickly sculpin (27)

Prickly sculpins were taken between km. 129 and 209 (fig. 26, table A-28).

Mottled sculpin (11)

Normal range: Km. 161 to 281 (fig. 26, table A-29).

Piute sculpin (13)

Normal range: Km. 177 to 281 (fig. 26, table A-30).
Periods of abundance: The greatest catches of Piute sculpins were made in November.

Torrent sculpin (7)

Normal range: Km. 145 to 281 (fig. 26, table A-31).

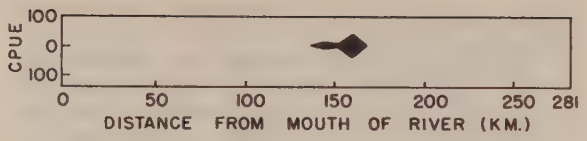


Figure 21.--CPUE (catch per unit of effort) of sand roller from the main stem of the Yakima River in 1957 and 1958, by sampling site.

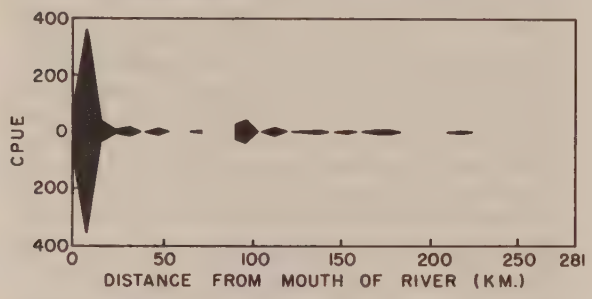


Figure 22.--CPUE (catch per unit of effort) of bluegill and pumpkinseed (combined) from the main stem of the Yakima River in 1957 and 1958, by sampling site.

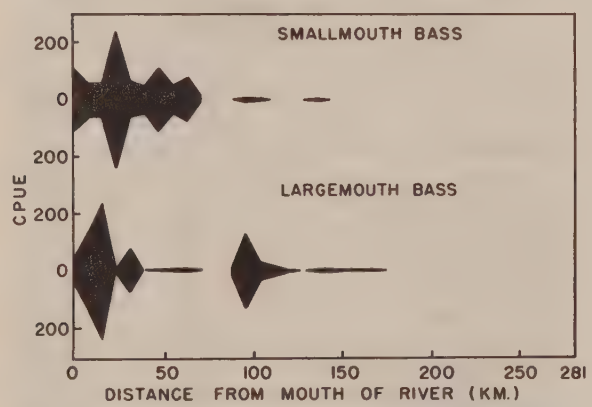


Figure 23.--CPUE (catch per unit of effort) of smallmouth and largemouth bass from the main stem of the Yakima River in 1957 and 1958, by sampling site.

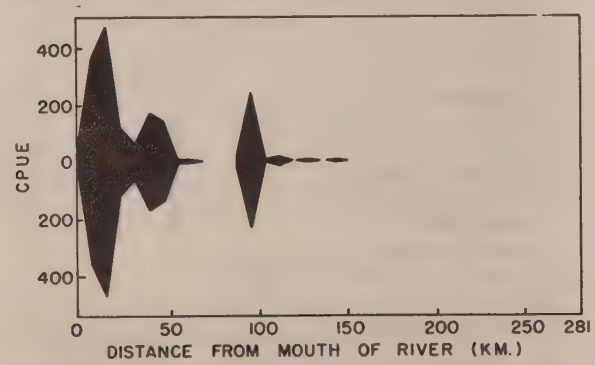


Figure 24.--CPUE (catch per unit of effort) of black crappie from the main stem of the Yakima River in 1957 and 1958, by sampling site.

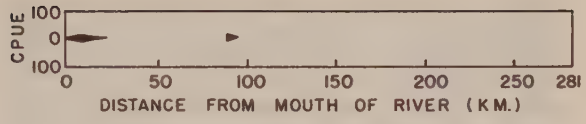


Figure 25.--CPUE (catch per unit of effort) of yellow perch from the main stem of the Yakima River in 1957 and 1958, by sampling site.

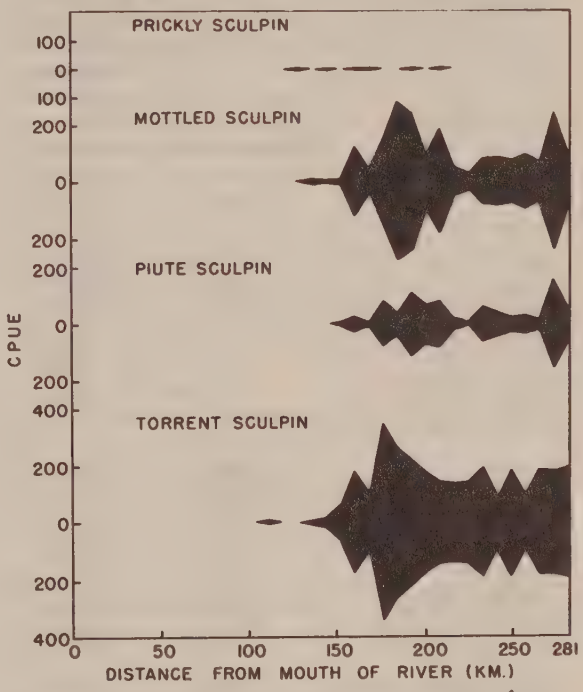


Figure 26.--CPUE (catch per unit of effort) of prickly, mottled, Piute, and torrent sculpin from the main stem of the Yakima River in 1957 and 1958, by sampling site.

EFFECT OF WATER TEMPERATURE AND FLOW ON DISTRIBUTION OF FISH

Many environmental factors control the distribution and abundance of fish in the Yakima River. Differences in temperature and velocity of the water, however, so clearly coincided with observed changes in abundance and distribution of some species that we believe they are dominant influences.

The volume of the Yakima River is low and the surface area relatively high in summer in sections below irrigation and power diversions; the low volume of water is heated by air and solar radiation, especially below the Sunnyside and Wapato irrigation diversions (between the sampling sites at km. 145 and 153). For example, during the sampling trip of July 15 to August 7, 1957, the average temperature for the three sites above these dams was 15° C. and for the three sites below, 20° C. The section near the dams also seemed

to be a boundary for the distribution of lamprey, salmon, trout, and sculpin, all of which were absent in summer collections at sampling sites downstream of km. 145. Because the dams do not prevent downstream movements, these species were probably blocked by high water temperatures or died from the effects of high temperatures.

Table 5.--Catch per unit of effort of fish taken downstream (km. 0-145) and upstream (km. 153-281) of the Sunnyside and Wapato irrigation diversions, by species, 1957-58

Species	Downstream the diversions	Upstream the diversions[1]
	CPUE	CPUE
Lamprey	18	146
Salmon	108	2,076
Mountain whitefish	958	2,124
Cutthroat trout	0	6
Rainbow trout	22	268
Brown trout	10	20
Brook trout	0	20
Dolly Varden	0	2
Chiselmouth	9,624	2,058
Carp	2,550	16
Peamouth	2	0
Northern squawfish	4,320	1,560
Longnose dace	346	384
Leopard dace	238	68
Speckled dace	2,084	712
Redside shiner	2,098	4,090
Bridgelip sucker	1,060	954
Largescale sucker	3,136	1,890
Mountain sucker	34	194
Black bullhead	104	0
Sand roller	10	44
Pumpkinseed-bluegill	562	12
Smallmouth bass	830	0
Largemouth bass	692	6
Black crappie	1,642	0
Yellow perch	28	0
Prickly sculpin	6	16
Mottled sculpin	8	1,802
Piute sculpin	0	804
Torrent sculpin	30	2,566
Hybrids (various)	24	14

[1] Catches in, and near, small streams at km. 217 and 250 were not similar to adjacent sampling sites, and are excluded from this table.

The composition of species downstream of the irrigation diversions differed greatly from the composition immediately upstream (table 5). Most[4] chiselmouth, carp, northern squawfish, speckled dace, leopard dace, black bullhead, pumpkinseed, bluegill, smallmouth bass, largemouth bass, black crappie, and yellow perch were taken at stations downstream of the diversions; most lamprey, salmon, mountain whitefish, cutthroat trout, rainbow trout, brown trout, brook trout, redside shiner, mountain sucker, sand roller, prickly sculpin, mottled sculpin, Piute sculpin, and torrent sculpin were taken upstream of the diversions. The species upstream are usually indicative in Washington of cold water--with the possible exception of redside shiner--and

Table 6.--Relative temperature (cold or warm) and velocity (low or high) or water from which most fish of each species were collected in the main stem of the Yakima River in 1957 and 1958

Species	Water temperature		Water velocity	
	Cold	Warm	Low	High
Lamprey	X	-	X	-
Salmon	X	-	-	X
Mountain whitefish	X	-	-	X
Cutthroat trout	X	-	-	X
Rainbow trout	X	-	-	X
Brown trout	X	-	-	X
Brook trout	X	-	X	-
Chiselmouth	-	X	-	X
Carp	-	X	X	-
Northern squawfish	-	X	-	X
Longnose dace	-	X	-	X
Leopard dace	-	X	-	X
Speckled dace	-	X	-	X
Redside shiner	-	X	-	X
Bridgelip sucker	-	X	-	X
Largescale sucker	-	X	-	X
Mountain sucker	X	-	-	X
Black bullhead	-	X	X	-
Sand roller	X	-	X	-
Pumpkinseed-bluegill	-	X	X	-
Smallmouth bass	-	X	-	X
Largemouth bass	-	X	X	-
Black crappie	-	X	X	-
Yellow perch	-	X	X	-
Prickly sculpin	X	-	X	-
Mottled sculpin	X	-	-	X
Piute sculpin	X	-	-	X
Torrent sculpin	X	-	-	X

[4] Two-thirds, or more, of the total CPUE of the species.

the species downstream usually indicate warm water; we, therefore, assumed that the main reason for the difference in composition of species was water temperature.

Temperatures in smaller stretches of the Yakima River also seem to influence the distribution of some fish. For example, summer temperatures were lower in the canyons from km. 177 to 201 and 233 to 250 than in the valleys. Few cyprinids and catostomids were observed in canyon areas compared with the sampling sites in the open valleys.

Throughout the study, few fish were taken from km. 69 to 89. Here the drop in elevation (fig. 2) and the water velocity are low, and the bottom is mud and sand (table 1). The riffles and rock bottoms in adjacent portions of the Yakima River are lacking in this area. Although six species of fishes were commonly taken in warm water of low velocity (table 6), the only one to frequent km. 60 to 89 consistently was the carp. Evidently the other species were not adapted to the environment in this part of the river.

FISH SPECIES THAT RESIDE WITH JUVENILE SALMON

The location of spawning grounds and behavior of the juvenile salmon before and during seaward migration determine the area in the Yakima River where young salmon and associated fish live. These factors vary within and between the species of salmon.

Juvenile coho and spring chinook salmon would be strongly influenced by the other fish above km. 153 because they live in this portion of the Yakima River during their first year of life. Salmon reside with 25 nonsalmon species above km. 153; salmon are generally more abundant than the cyprinids and catostomids. Juvenile coho and spring chinook salmon are more closely associated with other salmon, trout, and sculpins. In the spring of their second year of life, coho and spring chinook salmon migrate to sea and must pass through dense populations of resident fishes in the central and lower portions of the Yakima River (fig. 7).

Fall chinook salmon spawn below km. 153, and their progeny emerge from the gravel into an area inhabited by 27 nonsalmon species. The abundance of cyprinids, catostomids, and centrarchids is high. The duration of this association is short because of the early migration of fall chinook salmon fry, but the exact effects of these fish on the salmon are unknown.

SUMMARY

We studied a large tributary of the Columbia River to obtain information on the abundance and distribution of fish that live with juvenile salmon. This information is needed to understand how other species may limit the production of salmon.

Fish populations were sampled at 35 sites in the main stem (lower 281 km.) of the Yakima River at approximately 2-month intervals for 13 months in 1957 and 1958. Thirty-three of the 37 species of fish known from the Yakima were taken in collections numbering 34,733 specimens. Distribution and abundance are given for species and family groups. Dominant families by decreasing order of abundance were: Cyprinidae, Catostomidae, Salmonidae, Cottidae, and Centrarchidae. Dominant species by decreasing order of abundance were: chiselmouth, redside shiner, northern squawfish, largescale sucker, speckled dace, mountain whitefish, torrent sculpin, salmon (chinook and coho salmon combined), and carp. The distribution of fish in the Yakima River appears to be affected by summer water temperatures. Cold-water type fish are generally above km. 153 and warm-water type fish below this point. The section between km. 72 and 89 of the Yakima River which has low velocity, high summer temperatures, and a mud and silt bottom, has the fewest species and lowest numbers of fish.

The main spawning area of coho and spring chinook salmon is between km. 250 and 281. Their progeny live with 25 other species of fish for a prolonged period during presmolt stages, after which they pass (on their seaward migration) through the Yakima River's populations of 32 nonsalmon species.

Fall chinook salmon emerge from redds below km. 153 and are exposed immediately to 27 species of fish, and to greater numbers of predatory fishes than the coho and spring chinook salmon. The duration of this exposure is less, however, as fall chinook salmon migrate to the sea during the spring soon after their emergence from the gravel.

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APPENDIX

Table A-1.--Numbers of Pacific and western brook lamprey (combined) caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
24	2	2	-	-	-	-	-	-	-	-	-	-	2	6	4	8
48	1	2	-	-	-	-	-	-	-	-	-	-	1	2	2	4
56	1	2	-	-	-	-	-	-	-	-	-	-	-	-	1	2
137	-	-	1	2	-	-	-	-	-	-	-	-	-	-	1	2
145	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
153	-	-	-	-	-	-	-	-	6	10	3	4	-	-	9	14
161	-	-	-	-	2	2	-	-	-	-	1	2	-	-	3	4
201	-	-	-	-	2	8	1	2	1	4	-	-	-	-	4	14
209	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
217	-	-	9	8	7	10	5	10	5	8	1	2	1	4	28	42
225	-	-	1	2	6	10	-	-	5	12	-	-	-	-	12	24
233	-	-	-	-	2	4	-	-	-	-	-	-	-	-	2	4
241	1	0	-	-	5	6	-	-	-	-	-	-	1	2	7	8
250	-	-	7	8	1	2	2	4	-	-	1	2	4	10	15	26
258	4	6	-	-	1	2	1	2	-	-	-	-	-	-	6	10
266	-	-	1	2	2	4	13	18	10	12	1	2	1	2	28	40
274	-	-	12	8	5	6	-	-	-	-	2	2	3	6	22	22
281	-	-	-	-	-	-	-	-	1	2	-	-	1	2	2	4
Total	9	12	31	30	31	52	22	36	28	48	11	18	14	34	146	232

Table A-2.--Numbers caught and CPUE (catch per unit of effort), of chinook and coho salmon (combined) main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	-	-	-	-	-	-	-	-	-	-	2	4	2	6	4	10
8	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
16	-	-	-	-	-	-	-	-	1	2	1	2	-	-	2	4
40	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
56	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
89	-	-	-	-	-	-	-	-	-	-	3	8	-	-	3	8
97	-	-	-	-	-	-	-	-	-	-	9	16	4	6	13	22
105	-	-	-	-	-	-	-	-	-	-	1	2	1	2	2	4
113	1	0	-	-	-	-	-	-	2	6	2	4	-	-	5	10
120	1	2	1	2	-	-	-	-	-	-	7	12	-	-	9	16
129	-	-	-	-	-	-	-	-	-	-	11	18	1	4	12	22
145	-	-	-	-	-	-	-	-	-	-	2	4	1	2	3	6
153	-	-	4	6	-	-	1	2	10	16	54	72	3	6	72	102
161	-	-	-	-	-	-	1	2	6	6	8	10	2	4	17	22
169	1	0	-	-	1	2	2	4	2	4	1	2	-	-	7	12
177	5	6	-	-	1	2	2	4	5	8	1	2	-	-	14	22
185	4	4	-	-	1	2	-	-	3	8	8	16	-	-	16	30
193	14	10	-	-	-	-	-	-	-	-	1	2	2	6	17	18
201	6	6	-	-	6	24	7	18	13	48	33	60	10	26	75	182
209	11	8	-	-	8	12	-	-	-	-	2	4	1	2	22	26
217	-	-	2	2	17	22	37	64	31	52	7	12	7	24	101	176
225	-	-	3	4	1	2	11	40	9	22	18	26	45	90	87	184
233	-	-	1	0	2	4	6	18	2	6	5	10	12	14	28	52
241	-	-	-	-	4	4	7	16	14	38	18	32	-	-	43	90
250	-	-	2	2	2	4	40	96	6	10	6	8	33	90	89	208
258	1	2	2	4	2	6	21	46	27	64	61	88	54	98	168	308
266	19	34	4	4	6	14	106	152	13	16	27	34	62	178	237	432
274	-	-	17	12	14	18	10	34	8	14	40	60	80	160	169	298
281	-	-	3	6	-	-	8	20	1	2	20	42	114	228	146	298
Total	63	72	39	42	65	116	259	514	153	322	351	556	434	946	1,364	2,568

Table A-3.--Numbers of mountain whitefish caught and CPUE (catch per unit of effort) main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
8	1	2	-	-	29	40	9	16	6	18	9	18	2	6	56	100
16	-	-	-	-	-	-	1	2	13	20	1	2	-	-	15	24
24	-	-	-	-	3	6	9	16	12	16	6	6	-	-	30	44
32	-	-	-	-	19	22	2	4	5	8	3	4	1	4	30	42
40	-	-	-	-	9	10	7	20	14	56	12	26	-	-	42	112
48	-	-	1	2	2	4	12	20	9	24	11	20	-	-	35	70
56	-	-	1	2	-	-	4	14	4	12	4	8	1	2	14	38
64	1	2	-	-	7	10	2	8	-	-	24	72	-	-	34	92
72	1	0	1	2	-	-	-	-	-	-	-	-	-	-	2	2
89	1	0	-	-	-	-	-	-	-	-	-	-	-	-	1	0
97	-	-	-	-	-	-	1	2	-	-	-	-	3	4	4	6
105	-	-	-	-	1	2	2	4	-	-	2	2	-	-	5	8
113	2	2	3	4	3	6	4	12	6	16	7	14	1	2	26	56
120	1	2	13	26	18	22	14	30	8	14	19	32	4	8	77	134
129	1	0	2	4	5	8	1	2	13	38	6	10	2	8	30	70
137	-	-	3	4	-	-	-	-	7	16	4	8	10	28	24	56
145	2	2	19	26	4	4	11	14	12	30	12	24	1	2	61	102
153	2	2	3	4	2	4	2	6	15	24	11	14	2	4	37	68
161	2	2	6	4	4	2	3	4	11	12	7	8	6	14	39	46
169	17	16	11	6	27	50	22	44	28	56	22	38	11	20	138	230
177	23	24	14	20	37	68	7	16	26	46	29	26	14	38	150	258
185	5	4	-	-	12	12	14	28	9	24	38	74	12	28	90	170
193	29	22	-	-	7	18	2	6	13	26	29	62	12	32	92	168
201	25	20	6	6	34	136	25	62	7	26	33	60	18	28	148	358
209	13	10	2	2	26	38	43	122	14	50	33	62	10	16	141	300
217	25	14	-	-	3	4	40	68	5	8	49	86	10	32	132	214
225	13	24	2	2	1	2	34	126	1	2	9	12	5	10	65	178
233	1	2	3	2	1	2	16	46	-	-	4	8	4	4	29	64
241	-	-	2	2	2	2	17	40	-	-	4	6	2	4	27	54
250	-	-	1	2	13	20	10	24	1	2	5	8	6	16	36	72
258	2	4	-	-	-	-	20	44	9	22	12	18	1	2	44	90
266	-	-	1	2	1	2	16	22	-	-	-	-	-	-	18	26
274	-	-	-	-	-	-	3	10	7	12	-	-	11	22	21	44
281	-	-	2	4	-	-	30	76	-	-	-	-	-	-	32	80
Total	167	154	96	126	270	494	383	908	255	578	406	750	149	358	1,726	3,368

Table A-4.--Numbers of cutthroat trout caught and CPUE (catch per unit of effort) main stem of the Yakima River, 1957-58

Distance upstream from river mouth	Nov. 12-22		Total	
Km.	No.	CPUE	No.	CPUE
169	3	6	3	6
Total	3	6	3	6

Table A-5.--Numbers of rainbow trout caught and CPUE (catch per unit of effort) main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
40	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
72	-	-	-	-	-	-	-	-	-	-	2	4	-	-	2	4
89	1	0	-	-	-	-	-	-	-	-	-	-	-	-	1	0
97	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
105	-	-	-	-	-	-	-	-	2	4	3	4	-	-	5	8
113	-	-	-	-	-	-	-	-	-	-	2	4	-	-	2	4
177	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
185	3	2	-	-	-	-	-	-	-	-	-	-	8	18	11	20
193	2	2	-	-	-	-	-	-	-	-	-	-	-	-	2	2
201	-	-	-	-	-	-	2	6	-	-	3	6	-	-	5	12
209	2	2	5	2	1	2	-	-	-	-	2	4	-	-	10	10
217	7	4	-	-	2	2	11	18	11	18	6	10	5	18	42	70
225	5	10	-	-	1	2	4	14	1	2	4	6	-	-	15	34
233	-	-	-	-	-	-	4	12	2	6	5	10	10	12	21	40
241	1	0	-	-	2	2	2	4	6	16	2	4	1	2	14	28
250	-	-	-	-	3	4	7	16	1	2	1	2	-	-	12	24
258	1	2	-	-	-	-	5	12	2	4	1	2	-	-	9	20
266	-	-	-	-	3	6	5	8	16	20	4	6	6	18	32	58
274	-	-	1	0	-	-	5	16	4	6	4	6	-	-	14	28
281	-	-	-	-	-	-	1	2	2	4	-	-	4	8	7	14
Total	22	22	6	2	12	18	46	108	47	82	41	76	34	76	208	384

Table A-6.--Numbers of brown trout caught and CPUE (catch per unit of effort) main stem of the Yakima River, 1957-58

Distance upstream from river mouth	Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
24	1	2	-	-	-	-	1	2
40	-	-	-	-	2	8	2	8
161	-	-	-	-	7	16	7	16
169	-	-	-	-	2	4	2	4
217	-	-	1	2	-	-	1	2
Total	1	2	1	2	11	28	13	32

Table A-7.--Numbers of brook trout caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
185	-	-	-	-	-	-	-	-	-	-	1	2	1	2
209	1	0	-	-	-	-	-	-	-	-	-	-	1	0
217	4	2	-	-	1	2	3	6	2	4	-	-	10	14
250	-	-	-	-	1	2	-	-	5	8	2	6	8	16
258	-	-	-	-	1	2	-	-	1	2	-	-	2	4
266	-	-	-	-	-	-	3	4	-	-	1	2	4	6
274	-	-	1	0	-	-	1	2	1	2	-	-	3	4
281	-	-	2	4	-	-	-	-	-	-	-	-	2	4
Total	5	2	3	4	3	6	7	12	9	16	4	10	31	50

Table A-8.--Numbers of chiselmouth caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	4	6	-	-	3	4	3	6	2	2	23	42	45	128	80	188
8	25	34	31	42	10	14	3	6	7	20	77	154	29	96	182	366
16	-	-	16	26	3	4	1	2	51	78	122	182	12	60	205	352
24	50	40	34	54	10	18	53	96	274	366	61	64	91	304	573	942
32	9	14	102	188	135	158	2	4	45	76	237	348	9	28	539	816
40	81	62	127	174	1	4	9	26	13	52	41	90	102	364	374	772
48	25	26	4	4	42	66	95	158	105	270	385	700	59	132	715	1,356
56	-	-	17	20	104	232	-	-	12	34	97	210	25	54	255	550
64	18	18	19	30	222	342	102	408	106	196	79	240	43	80	589	1,314
72	1	0	3	4	1	2	-	-	-	-	1	2	1	2	7	10
89	9	6	6	8	1	0	-	-	-	-	2	6	11	18	29	38
97	4	4	2	4	-	-	1	2	-	-	-	-	11	18	18	28
105	-	-	9	18	145	170	8	18	-	-	11	14	8	22	181	242
113	7	6	41	58	24	46	3	8	6	16	-	-	41	110	122	244
120	59	98	11	22	139	168	19	40	100	176	38	64	59	114	425	682
129	53	44	10	20	59	90	32	64	14	42	93	156	14	56	275	472
137	99	66	16	22	51	114	28	62	4	8	213	374	39	112	450	758
145	113	62	7	10	4	4	231	292	-	-	24	48	35	78	414	494
153	94	78	-	-	94	154	18	52	188	308	38	52	46	92	478	736
161	41	26	14	8	62	44	71	94	52	52	116	146	42	100	398	470
169	25	22	82	44	19	34	53	106	73	146	77	136	32	60	361	548
177	-	-	-	-	1	2	2	4	-	-	4	6	33	90	40	102
185	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
193	-	-	-	-	-	-	-	-	-	-	-	-	18	50	18	50
201	-	-	-	-	-	-	-	-	-	-	-	-	2	6	2	6
209	-	-	-	-	-	-	-	-	-	-	-	-	86	140	86	140
217	-	-	8	8	27	36	5	8	1	2	3	6	7	24	51	84
225	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
233	-	-	1	0	-	-	-	-	-	-	-	-	-	-	1	0
250	-	-	-	-	-	-	55	128	-	-	-	-	-	-	55	128
266	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
Total	717	612	560	764	1,157	1,706	794	1,584	1,053	1,844	1,745	3,046	900	2,338	6,926	11,894

Table A-9.--Numbers of carp caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	32	50	8	18	15	24	1	2	-	-	4	8	14	40	74	142
8	31	42	55	74	97	132	33	56	25	72	35	70	13	44	289	490
16	28	46	24	38	31	34	1	2	8	12	6	8	33	166	131	306
24	31	24	34	54	10	18	8	14	8	10	11	12	9	30	111	162
32	1	2	7	12	22	26	1	2	1	2	3	4	2	6	37	54
40	30	22	2	2	-	-	-	-	8	32	-	-	3	10	43	66
48	21	22	19	20	46	74	23	38	7	18	27	50	10	22	153	249
56	-	-	1	2	155	344	2	6	1	2	1	2	1	2	161	358
64	-	-	11	16	8	12	3	12	2	4	-	-	3	6	27	50
72	29	20	14	22	7	10	-	-	-	-	4	8	22	48	76	108
89	33	26	5	8	20	18	1	2	4	6	19	52	25	40	107	152
97	9	10	13	28	6	6	1	2	3	4	7	12	8	12	47	74
105	-	-	7	14	12	14	3	6	-	-	8	10	3	8	33	52
113	11	10	13	18	-	-	6	18	4	10	14	28	17	46	65	130
120	1	2	6	12	5	6	11	24	5	8	10	16	2	4	40	72
129	3	2	1	2	1	2	-	-	-	-	1	2	-	-	6	8
137	20	14	3	4	5	12	4	8	1	2	7	12	3	8	43	60
145	18	10	3	4	1	2	-	-	-	-	-	-	3	6	25	22
161	-	-	4	2	1	0	-	-	2	2	1	2	1	2	9	8
169	-	-	3	2	2	4	1	2	-	-	-	-	-	-	6	8
Total	298	302	233	352	444	738	99	194	79	184	158	296	172	500	1,483	2,566

Table A-10.--Numbers of northern squawfish caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	4	6	-	-	3	4	11	20	13	16	44	80	6	18	81	144
8	37	50	3	4	8	10	12	20	3	8	43	86	52	174	158	352
16	-	-	2	4	2	2	1	2	3	4	8	12	4	20	20	44
24	87	70	9	14	19	32	24	44	49	66	22	24	124	414	334	664
32	8	12	29	54	84	98	6	14	56	94	122	180	135	422	440	874
40	41	32	38	52	12	48	3	8	8	32	24	52	61	218	187	442
48	19	20	6	6	32	50	37	62	19	48	83	150	51	114	247	450
56	-	-	9	10	33	74	-	-	-	-	7	16	6	12	55	112
64	4	4	1	2	8	12	13	52	12	22	5	16	21	38	64	146
72	4	2	1	2	3	4	-	-	-	-	-	-	1	2	9	10
89	1	0	-	-	2	2	-	-	-	-	-	-	1	2	4	4
97	1	2	-	-	-	-	1	2	-	-	-	-	2	4	4	8
105	-	-	2	4	55	64	13	28	1	2	3	4	2	6	76	108
113	-	-	1	2	13	26	1	2	4	10	-	-	10	28	29	68
120	4	6	22	44	18	22	11	24	14	24	4	6	8	16	81	142
129	40	34	8	16	22	34	24	48	15	44	39	66	14	56	162	298
137	37	24	11	16	5	12	4	8	12	26	91	160	12	34	172	260
145	37	20	17	22	3	4	40	50	2	4	15	30	20	44	134	174
153	19	16	5	6	64	104	8	22	82	134	11	14	14	28	203	324
161	31	20	4	2	43	30	28	38	38	38	33	42	13	30	190	200
169	37	34	39	20	52	94	27	54	51	102	19	122	27	50	302	476
177	6	6	2	2	4	8	60	136	6	10	4	6	5	14	87	182
185	-	-	-	-	14	14	-	-	-	-	14	26	-	-	28	40
193	3	2	-	-	4	10	1	2	-	-	-	-	49	136	57	150
201	-	-	-	-	4	16	14	36	-	-	2	4	1	2	21	58
209	-	-	1	0	1	2	-	-	-	-	3	6	31	50	36	58
217	-	-	43	42	53	70	7	12	1	2	10	18	30	104	144	248
225	-	-	1	2	1	2	-	-	3	8	11	16	-	-	16	28
241	-	-	-	-	1	2	-	-	-	-	-	-	1	2	2	4
250	-	-	3	4	1	2	32	74	1	2	-	-	9	24	46	106
258	-	-	-	-	-	-	-	-	-	-	-	-	21	38	21	38
281	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	2
Total	420	360	257	330	564	852	378	758	393	696	667	1,136	732	2,102	3,411	6,234

Table A-11.--Numbers of longnose dace caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
8	2	2	-	-	-	-	-	-	-	-	-	-	2	6	4	8
16	-	-	11	18	-	-	-	-	-	-	-	-	-	-	11	18
24	1	0	-	-	-	-	-	-	-	-	-	-	2	6	3	6
40	10	8	61	84	-	-	-	-	-	-	-	-	10	36	81	128
48	-	-	3	4	-	-	-	-	-	-	-	-	-	-	3	4
56	8	16	11	12	-	-	-	-	-	-	1	2	1	2	21	32
64	1	2	-	-	-	-	-	-	-	-	-	-	1	2	2	4
72	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
105	-	-	-	-	3	4	1	2	-	-	-	-	-	-	4	6
113	-	-	1	2	-	-	-	-	-	-	-	-	-	-	1	2
120	-	-	3	6	10	12	1	2	1	2	-	-	-	-	15	22
129	-	-	7	14	30	46	-	-	-	-	1	2	1	4	39	66
137	3	2	9	12	2	4	-	-	-	-	-	-	-	-	14	18
145	-	-	21	28	-	-	-	-	-	-	-	-	1	2	22	30
153	-	-	17	22	4	6	-	-	1	2	-	-	-	-	22	30
161	-	-	13	8	1	0	-	-	-	-	-	-	-	-	14	8
169	6	6	4	2	-	-	-	-	-	-	-	-	2	4	12	12
177	3	2	-	-	1	2	-	-	-	-	-	-	-	-	4	6
185	-	-	38	96	34	34	-	-	-	-	-	-	1	2	73	132
193	-	-	6	6	8	20	-	-	-	-	-	-	5	14	19	40
201	-	-	10	10	-	-	-	-	-	-	-	-	-	-	10	10
209	4	4	14	8	11	16	-	-	-	-	1	2	6	10	36	40
217	-	-	1	0	5	6	1	2	2	4	1	2	-	-	10	14
225	1	2	-	-	-	-	-	-	-	-	-	-	-	-	1	2
233	-	-	25	22	16	26	-	-	-	-	-	-	-	-	41	48
241	6	4	-	-	7	8	-	-	-	-	-	-	-	-	13	12
250	-	-	8	10	9	14	-	-	1	2	29	42	2	6	49	74
258	-	-	-	-	-	-	-	-	-	-	-	-	4	8	4	8
266	-	-	3	4	-	-	-	-	-	-	-	-	-	-	3	4
274	-	-	2	2	-	-	-	-	1	2	1	2	2	4	6	10
281	-	-	-	-	4	6	-	-	-	-	6	12	2	4	12	22
Total	45	50	268	370	145	204	3	6	6	12	41	66	42	110	550	818

Table A-12.--Numbers of leopard dace caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
24	1	0	-	-	-	-	-	-	-	-	-	-	1	4	2	4
48	-	-	-	-	18	28	-	-	-	-	-	-	-	-	18	28
56	-	-	1	2	-	-	-	-	-	-	4	8	-	-	5	10
64	-	-	-	-	-	-	-	-	-	-	3	10	-	-	3	10
113	-	-	-	-	1	2	-	-	-	-	-	-	-	-	1	2
120	2	4	1	2	7	8	1	2	-	-	-	-	-	-	11	16
129	23	20	1	2	17	26	-	-	2	6	1	2	9	36	53	92
137	11	8	3	4	4	8	3	6	6	14	3	6	-	-	30	46
145	-	-	6	8	-	-	-	-	-	-	10	20	1	2	17	30
153	-	-	-	-	1	2	1	2	-	-	-	-	2	4	4	8
161	-	-	2	2	-	-	-	-	-	-	-	-	-	-	2	2
169	-	-	-	-	1	2	3	6	-	-	-	-	1	2	5	10
209	-	-	31	18	-	-	-	-	-	-	-	-	-	-	31	18
217	-	-	5	4	-	-	-	-	-	-	-	-	-	-	5	4
241	-	-	26	30	-	-	-	-	-	-	-	-	-	-	26	30
250	-	-	-	-	-	-	-	-	-	-	7	10	-	-	7	10
Total	37	32	76	72	49	76	8	16	8	20	28	56	14	48	220	320

Table A-13.--Numbers of speckled dace caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	-	-	1	2	-	-	3	6	-	-	-	-	-	-	4	8
8	2	2	-	-	-	-	-	-	-	-	-	-	2	6	4	8
16	-	-	3	4	-	-	-	-	-	-	-	-	-	-	3	4
24	1	0	-	-	-	-	-	-	-	-	2	2	1	4	4	6
32	1	2	1	2	28	32	-	-	-	-	-	-	1	4	31	40
40	13	10	42	58	10	40	-	-	-	-	7	16	13	46	85	170
48	44	26	4	4	-	-	18	30	1	2	3	6	52	116	122	204
56	53	106	41	28	68	152	1	4	-	-	17	36	49	104	229	450
64	102	108	74	114	23	36	-	-	-	-	7	22	150	278	356	558
105	-	-	-	-	-	-	1	2	-	-	-	-	-	-	1	2
113	2	2	5	8	-	-	-	-	1	2	-	-	-	-	8	12
120	2	4	3	6	9	10	1	2	-	-	3	6	2	4	20	32
129	6	6	35	70	107	164	-	-	-	-	9	16	-	-	157	256
137	57	38	36	52	51	114	6	14	14	32	1	2	-	-	165	252
145	24	14	17	22	-	-	2	2	-	-	15	30	6	14	64	82
153	36	30	13	16	5	8	1	2	7	12	2	2	4	8	68	78
161	11	6	8	4	4	2	4	6	14	14	5	6	-	-	46	38
169	3	2	14	8	2	4	-	-	-	-	1	2	-	-	20	16
177	-	-	2	2	-	-	-	-	-	-	1	2	1	2	4	6
185	2	2	2	6	5	6	-	-	-	-	3	6	-	-	12	20
193	-	-	10	10	5	12	-	-	-	-	-	-	15	42	30	64
201	6	6	18	20	-	-	1	2	2	8	-	-	-	-	27	36
209	2	2	-	-	21	30	-	-	-	-	11	20	-	-	34	52
217	128	70	237	232	264	352	321	554	125	212	280	492	87	300	1,442	2,212
225	63	114	1	2	-	-	-	-	-	-	12	18	6	12	82	146
233	-	-	64	56	1	2	-	-	-	-	-	-	1	2	66	60
241	-	-	1	2	8	8	-	-	-	-	-	-	3	6	12	16
250	-	-	21	24	6	10	7	16	5	8	13	18	77	208	129	284
258	-	-	-	-	-	-	-	-	-	-	-	-	38	70	38	70
266	1	2	-	-	-	-	-	-	-	-	1	2	-	-	2	4
274	-	-	47	32	22	28	1	4	1	2	-	-	2	4	73	70
281	-	-	-	-	-	-	-	-	3	6	2	4	13	26	18	36
Total	559	572	700	804	639	1,010	367	644	173	298	395	708	523	1,256	3,356	5,292

Table A-14.--Numbers of redside shiner caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	-	-	-	-	6	10	1	2	1	2	15	28	1	2	24	44
8	4	6	-	-	-	-	-	-	-	-	3	6	5	16	12	28
24	4	4	-	-	-	-	1	2	2	2	-	-	4	14	11	22
32	1	2	11	20	2	2	-	-	-	-	11	16	1	4	26	44
48	1	2	-	-	-	-	-	-	1	2	-	-	3	6	5	10
56	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
64	-	-	-	-	1	2	-	-	-	-	1	4	-	-	2	6
89	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
105	-	-	-	-	1	2	-	-	-	-	1	2	1	2	3	6
113	7	6	7	8	5	10	-	-	-	-	-	-	3	8	22	32
120	42	70	-	-	108	130	2	4	40	70	65	110	48	92	305	476
129	23	20	12	24	30	46	29	58	5	14	59	98	39	156	197	416
137	53	36	53	76	23	52	7	16	11	24	228	400	39	112	414	716
145	135	76	26	34	-	-	49	62	-	-	39	78	20	44	269	294
153	97	80	38	48	154	252	77	220	347	568	33	44	36	72	782	1,284
161	100	62	8	4	60	42	173	230	183	184	301	382	19	46	844	950
169	48	44	15	8	22	40	132	264	226	452	53	92	4	8	500	908
177	4	4	1	2	5	10	40	90	46	80	123	192	14	38	233	416
185	-	-	-	-	1	2	-	-	-	-	15	28	-	-	16	30
193	1	0	-	-	13	32	-	-	-	-	9	20	4	12	27	64
201	-	-	-	-	-	-	6	16	2	8	1	2	1	2	10	28
209	6	4	4	2	7	10	-	-	-	-	1	2	44	72	62	90
217	116	62	80	78	79	103	81	140	19	32	120	210	95	328	590	956
225	23	42	2	2	12	18	10	38	8	20	50	72	5	10	110	202
233	-	-	8	8	-	-	-	-	-	-	-	-	2	2	10	10
241	13	10	-	-	2	2	-	-	-	-	1	2	-	-	16	14
250	-	-	17	20	19	30	1	2	4	6	1	2	66	89	178	238
258	-	-	-	-	-	-	-	-	-	-	1	2	44	80	45	82
274	-	-	-	-	-	-	-	-	2	4	-	-	-	-	2	4
281	-	-	-	-	-	-	-	-	-	-	-	-	4	8	4	8
Total	678	530	282	334	550	798	609	1,144	897	1,468	1,133	1,796	502	1,312	4,651	7,382

Table A-15.--Numbers of chiselmouth X northern squawfish (hybrid) caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
8	-	-	1	2	-	-	-	-	1	2
24	-	-	-	-	1	2	1	2	2	4
48	1	2	-	-	-	-	-	-	1	2
97	1	2	-	-	-	-	-	-	1	2
137	-	-	-	-	-	-	4	8	4	8
145	-	-	1	2	-	-	-	-	1	2
161	-	-	2	2	-	-	1	2	3	4
169	-	-	-	-	1	2	-	-	1	2
Total	2	4	4	6	2	4	6	12	14	26

Table A-16.--Numbers of speckled dace X redside shiner (hybrid) caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	Sept. 18-Oct. 18		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE
153	1	2	-	-	1	2
209	1	2	-	-	1	2
258	-	-	1	2	1	2
Total	2	4	1	2	3	6

Table A-17.--Numbers of bridgelip sucker caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	1	2	-	-	3	4	-	-	-	-	1	2	-	-	5	8
8	17	22	-	-	2	2	1	2	2	6	-	-	15	50	37	82
16	-	-	2	4	-	-	-	-	1	2	-	-	-	-	3	6
24	9	8	-	-	1	2	-	-	1	2	-	-	7	24	18	36
32	1	2	-	-	5	6	2	4	2	4	1	2	1	4	12	22
40	6	4	7	10	1	4	-	-	2	8	-	-	2	8	18	34
48	4	4	-	-	9	14	-	-	2	6	3	6	7	16	25	46
56	-	-	1	2	3	6	-	-	5	14	2	4	3	6	14	32
64	10	10	4	6	1	2	1	4	1	2	2	6	1	2	20	32
72	3	4	-	-	2	4	-	-	-	-	3	6	4	8	14	22
89	6	4	-	-	-	-	-	-	-	-	4	12	1	2	11	18
97	1	2	-	-	-	-	-	-	-	-	-	-	4	6	5	8
105	-	-	-	-	2	2	2	4	-	-	6	8	14	40	24	54
113	3	2	1	2	9	18	3	8	5	12	8	16	1	2	30	60
120	-	-	-	-	12	14	8	18	13	22	31	52	3	6	67	112
129	3	2	-	-	12	18	8	16	7	20	22	36	8	32	60	124
137	7	4	4	6	-	-	4	8	14	32	12	22	16	46	57	118
145	129	72	23	30	3	4	3	4	16	40	38	76	9	20	221	246
153	97	80	19	24	28	46	4	12	29	48	18	24	12	24	207	258
161	5	4	1	0	1	0	11	14	8	8	9	12	16	38	51	76
169	10	10	19	10	1	2	2	4	9	18	7	12	11	20	59	76
177	2	2	-	-	18	32	38	86	3	6	2	4	7	18	70	148
185	-	-	7	18	6	6	1	2	-	-	10	20	1	2	25	48
193	-	-	12	10	9	22	-	-	-	-	-	-	4	12	25	44
201	1	0	2	2	11	44	1	2	1	4	3	6	7	18	26	76
209	2	2	-	-	3	4	-	-	-	-	3	6	5	8	13	20
217	-	-	76	72	154	206	61	106	28	48	25	44	26	90	370	568
225	12	22	-	-	6	10	-	-	2	4	17	24	8	16	45	76
233	-	-	-	-	-	-	17	48	1	2	1	2	-	-	19	52
241	-	-	4	4	2	2	-	-	-	-	1	2	-	-	7	8
250	-	-	13	16	4	6	1	6	1	2	6	8	-	-	25	38
258	-	-	-	-	-	-	1	2	-	-	-	-	36	66	37	68
274	-	-	-	-	-	-	1	4	-	-	-	-	-	-	1	4
Total	331	262	195	218	308	480	170	354	153	310	235	412	229	584	1,621	2,620

Table A-18.--Numbers of largescale sucker caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	3	4	1	2	1	2	-	-	3	4	3	6	5	14	16	32
8	15	20	5	6	26	36	6	10	1	2	19	38	12	40	84	152
16	-	-	20	32	6	6	-	-	18	12	4	6	-	-	38	56
24	48	38	6	10	37	64	7	12	14	18	3	4	23	76	138	222
32	2	4	15	28	27	32	17	38	7	12	18	26	18	56	104	196
40	6	4	7	10	7	28	-	-	6	24	9	20	34	122	69	208
48	4	4	6	6	13	20	15	26	9	24	11	20	9	20	67	120
56	1	2	4	4	5	12	9	20	17	48	12	26	5	10	53	132
64	7	8	4	6	6	10	3	12	5	10	17	52	10	18	52	116
72	10	6	1	2	8	12	2	8	1	2	-	-	30	66	52	96
89	6	4	2	2	5	4	3	6	1	2	1	2	4	6	22	26
97	1	2	1	2	1	2	1	2	1	2	1	2	6	10	12	22
105	-	-	9	18	83	98	10	22	4	6	10	14	4	12	120	170
113	6	6	7	10	24	46	8	24	6	16	12	24	8	22	71	148
120	-	-	-	-	19	22	60	128	20	36	42	72	30	58	171	316
129	12	10	-	-	25	38	39	78	34	100	83	138	17	68	210	432
137	86	58	8	12	5	12	53	118	36	80	60	106	10	28	258	414
145	160	88	35	46	-	-	11	14	12	30	29	58	19	42	266	278
153	188	156	5	6	57	94	9	26	93	152	87	118	20	40	459	592
161	13	8	13	8	6	4	36	48	37	38	50	64	16	38	171	208
169	8	8	28	14	53	96	25	50	52	104	52	92	22	42	240	406
177	5	6	7	10	23	42	11	26	25	44	16	26	34	92	121	246
185	1	0	-	-	6	6	5	10	1	2	19	36	27	62	59	116
193	2	2	15	14	1	2	4	12	4	8	-	-	6	16	32	54
201	4	4	-	-	3	12	16	40	-	-	10	18	1	2	34	76
209	7	6	2	2	6	8	8	22	-	-	1	2	17	28	41	68
217	4	2	79	78	71	94	22	38	14	24	22	38	16	56	228	330
225	10	18	-	-	3	4	-	-	1	2	21	30	3	6	38	60
233	-	-	6	6	-	-	3	8	-	-	-	-	-	-	9	14
241	-	-	-	-	1	2	3	8	-	-	6	10	-	-	10	20
250	-	-	14	16	-	-	1	2	-	-	2	2	6	16	23	36
258	-	-	-	-	-	-	-	-	-	-	8	12	2	4	10	16
266	-	-	-	-	-	-	2	2	-	-	-	-	1	2	3	4
274	-	-	-	-	-	-	-	-	4	6	-	-	-	-	4	6
281	-	-	-	-	-	-	1	2	-	-	-	-	1	2	2	4
Total	609	468	300	350	528	808	390	822	416	808	628	1,062	416	1,074	3,287	5,392

Table A-19.--Number of mountain sucker caught and CPUE (catch per unit of effort) main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
48	-	-	-	-	-	-	-	-	-	-	2	4	2	4
56	-	-	-	-	-	-	-	-	1	2	-	-	1	2
105	-	-	-	-	-	-	-	-	-	-	1	2	1	2
120	-	-	-	-	-	-	-	-	1	2	-	-	1	2
137	1	0	-	-	-	-	-	-	-	-	-	-	1	-
145	-	-	-	-	-	-	-	-	-	-	11	24	11	24
153	-	-	-	-	1	2	-	-	2	2	12	24	15	28
161	-	-	-	-	-	-	1	2	-	-	6	14	7	16
169	-	-	-	-	4	8	1	2	-	-	3	6	8	16
177	-	-	3	4	-	-	-	-	-	-	-	-	3	4
185	2	2	-	-	-	-	-	-	5	10	4	10	11	22
193	-	-	5	4	-	-	-	-	-	-	12	34	17	38
201	1	0	1	21	8	32	-	-	-	-	-	-	10	34
209	1	0	4	2	-	-	-	-	1	2	9	14	15	18
217	-	-	-	-	4	6	3	6	-	-	-	-	7	12
225	-	-	-	-	-	-	-	-	-	-	1	2	1	2
241	-	-	1	2	-	-	-	-	-	-	-	-	1	2
250	-	-	1	2	2	4	-	-	1	21	4	10	8	18
258	-	-	-	-	-	-	-	-	-	-	7	12	7	12
266	1	2	-	-	-	-	-	-	-	-	-	-	1	2
Total	6	4	15	16	19	52	5	10	12	22	71	54	128	258

Table A-20.--Numbers of bridgelip sucker X largescale sucker (hybrid) caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	Sept. 18-Oct. 18		Jan. 1-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
32	-	-	1	2	-	-	1	2
120	-	-	-	-	1	2	1	2
169	1	2	-	-	-	-	1	2
Total	1	2	1	2	1	2	3	6

Table A-21.--Numbers of black bullhead caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	2	4	17	38	-	-	-	-	-	-	1	2	2	6	22	50
8	1	2	1	2	-	-	1	2	-	-	1	2	1	4	5	12
16	-	-	-	-	2	2	-	-	-	-	15	22	-	-	17	24
24	-	-	-	-	-	-	-	-	-	-	-	-	1	4	1	4
32	1	2	-	-	-	-	-	-	-	-	-	-	-	-	1	2
40	-	-	-	-	-	-	-	-	-	-	-	-	1	4	1	4
48	1	2	-	-	-	-	-	-	-	-	-	-	-	-	1	2
97	1	2	-	-	-	-	-	-	-	-	-	-	-	-	1	2
105	-	-	-	-	-	-	-	-	2	4	-	-	-	-	2	4
Total	6	12	18	40	2	2	1	2	2	4	17	26	5	18	51	104

Table A-22.--Numbers of sand roller caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
145	-	-	7	10	-	-	-	-	-	-	-	-	7	10
153	-	-	-	-	-	-	-	-	-	-	4	6	4	6
161	2	2	-	-	8	6	6	8	14	14	6	8	36	38
Total	2	2	7	10	8	6	6	8	14	14	10	14	47	54

Table A-23.--Numbers of pumpkinseed and bluegill (combined) caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	-	-	3	6	15	24	6	10	-	-	5	10	-	-	29	50
8	5	6	26	36	48	66	93	160	4	12	34	68	5	16	215	364
16	-	-	1	2	7	8	6	10	-	-	5	8	1	6	20	34
24	-	-	-	-	1	2	2	4	-	-	-	-	-	-	3	6
32	-	-	-	-	13	16	-	-	-	-	-	-	-	-	13	16
48	-	-	3	4	1	2	2	4	1	2	1	2	-	-	8	14
72	-	-	-	-	1	2	-	-	-	-	-	-	-	-	1	2
89	4	4	1	2	9	8	1	2	-	-	-	-	1	2	16	18
97	6	6	-	-	-	-	10	22	1	2	5	10	-	-	22	40
113	1	0	2	2	4	8	1	2	-	-	-	-	-	-	8	12
129	-	-	-	-	1	2	-	-	-	-	-	-	-	-	1	2
137	-	-	-	-	-	-	1	2	-	-	-	-	1	2	2	4
153	-	-	-	-	1	2	-	-	-	-	-	-	-	-	1	2
169	-	-	1	0	-	-	2	4	-	-	-	-	-	-	3	4
177	-	-	-	-	-	-	3	6	-	-	-	-	-	-	3	6
217	-	-	-	-	1	2	-	-	-	-	-	-	-	-	1	2
Total	16	16	37	52	102	142	127	226	6	16	50	98	8	26	346	576

Table A-24.--Numbers of smallmouth bass caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	-	-	5	12	21	34	10	18	-	-	18	32	4	12	58	108
8	10	14	5	6	-	-	4	6	3	6	-	-	8	26	29	58
16	4	6	13	20	4	4	6	10	1	2	3	4	2	10	33	56
24	16	12	3	4	54	94	30	54	30	40	4	4	10	34	147	242
32	-	-	6	12	-	-	12	26	5	8	5	8	3	10	31	64
40	4	4	1	2	-	-	6	18	1	4	1	2	5	18	18	48
48	8	8	23	24	23	36	7	12	-	-	5	10	8	18	74	108
56	-	-	1	2	2	4	-	-	-	-	9	20	11	24	23	50
64	2	2	4	6	11	16	3	12	1	2	5	16	11	20	37	74
72	2	2	1	2	-	-	-	-	-	-	-	-	1	2	4	6
97	-	-	1	2	-	-	-	-	4	6	-	-	-	-	5	8
105	-	-	3	6	-	-	-	-	-	-	-	-	-	-	3	6
137	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
Total	46	48	66	98	115	188	78	156	44	68	51	98	63	174	463	830

Table A-25.--Numbers of largemouth bass caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	-	-	4	10	2	4	-	-	-	-	12	22	-	-	18	36
8	4	6	9	12	19	26	20	34	9	26	2	4	7	24	70	132
16	2	4	-	-	31	34	-	-	5	8	37	56	27	136	102	238
24	-	-	-	-	-	-	-	-	3	4	-	-	-	-	3	4
32	-	-	-	-	64	76	-	-	-	-	-	-	-	-	64	76
48	-	-	-	-	-	-	1	2	-	-	-	-	-	-	1	2
56	-	-	-	-	-	-	1	4	-	-	-	-	-	-	1	4
64	4	4	-	-	-	-	-	-	-	-	-	-	-	-	4	4
72	-	-	1	2	-	-	-	-	-	-	-	-	-	-	1	2
89	5	4	-	-	1	0	1	2	-	-	-	-	-	-	7	6
97	7	8	3	6	16	18	15	34	-	-	27	50	8	12	76	128
105	-	-	-	-	12	14	5	12	-	-	-	-	1	2	18	28
113	-	-	3	4	3	6	2	6	-	-	2	4	-	-	10	20
120	-	-	1	2	-	-	-	-	-	-	-	-	-	-	1	2
137	-	-	-	-	-	-	1	2	-	-	1	2	-	-	2	4
145	-	-	-	-	1	2	1	2	1	2	-	-	-	-	3	6
153	-	-	-	-	-	-	-	-	1	2	-	-	-	-	1	2
161	-	-	1	0	2	2	-	-	-	-	-	-	-	-	3	2
169	-	-	3	2	-	-	-	-	-	-	-	-	-	-	3	2
Total	22	26	25	38	151	182	47	98	19	42	81	138	43	174	388	698

Table A-26.--Numbers of black crappie caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	9	14	1	2	3	4	-	-	-	-	-	-	-	-	13	20
8	-	-	13	18	10	14	11	18	56	160	59	118	11	36	160	364
16	42	70	13	20	14	16	1	2	118	182	97	144	8	40	293	474
24	2	2	-	-	5	8	-	-	2	2	5	6	29	96	43	114
32	32	50	1	2	6	8	-	-	-	-	-	-	2	6	41	66
40	25	20	1	2	-	-	-	-	9	36	-	-	32	114	67	172
48	-	-	-	-	5	8	4	6	14	36	15	20	29	64	67	142
56	-	-	3	4	-	-	-	-	-	-	-	-	-	-	3	4
64	1	2	-	-	2	4	-	-	-	-	-	-	-	-	3	6
89	-	-	-	-	2	2	1	2	-	-	3	8	3	4	9	16
97	7	8	1	2	29	32	17	38	74	114	18	32	9	14	155	240
105	-	-	-	-	2	2	-	-	-	-	1	2	-	-	3	4
113	1	0	-	-	1	2	1	2	-	-	5	10	1	2	9	16
129	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
145	-	-	-	-	-	-	-	-	1	2	-	-	-	-	1	2
Total	119	166	33	50	79	100	35	68	274	532	204	350	124	376	868	1,642

Table A-27.--Numbers of yellow perch caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-30		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
0	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
8	-	-	1	2	3	4	-	-	-	-	1	2	1	4	6	12
16	-	-	-	-	-	-	-	-	1	2	-	-	-	-	1	2
89	2	2	-	-	-	-	2	4	-	-	2	6	-	-	6	12
Total	2	2	1	2	3	4	2	4	1	2	4	10	1	4	14	28

Table A-28.--Numbers of prickly sculpin caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	July 14-Aug. 7		Sept. 18-Oct. 18		Jan. 1-21		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
129	-	-	1	2	1	2	2	4
145	1	2	-	-	-	-	1	2
161	-	-	3	2	1	2	4	4
169	1	0	-	-	-	-	1	0
193	-	-	2	6	-	-	2	6
209	-	-	4	6	-	-	4	6
Total	2	2	10	16	2	4	14	22

Table A-29.--Numbers of mottled sculpin caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-30		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
137	-	-	-	-	-	-	-	-	3	6	-	-	-	-	3	6
145	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
153	-	-	-	-	-	-	2	6	1	2	-	-	-	-	3	8
161	-	-	19	10	28	20	46	62	16	16	7	8	-	-	116	116
169	-	-	1	0	-	-	11	22	1	2	8	14	2	4	23	42
177	8	8	15	22	1	2	43	98	3	6	12	18	-	-	82	154
185	-	-	-	-	30	30	61	120	5	12	43	82	14	32	153	276
193	1	0	7	6	70	176	1	2	-	-	21	44	5	14	105	242
201	4	4	1	2	-	-	19	48	3	12	3	6	8	22	38	94
209	18	14	14	8	12	20	23	66	6	22	2	4	32	52	109	186
217	-	-	-	-	16	22	5	8	-	-	9	16	1	4	31	50
225	2	4	-	-	-	-	-	-	5	12	10	14	-	-	17	30
233	-	-	-	-	6	10	2	6	2	6	5	10	38	46	53	78
241	2	2	4	4	11	12	2	4	2	6	7	12	21	44	49	84
250	-	-	-	-	-	-	4	10	8	12	10	14	14	38	36	74
258	7	12	-	-	5	14	8	18	9	22	11	16	7	12	47	94
266	4	8	-	-	1	2	1	2	2	2	6	8	16	46	30	68
274	1	2	-	-	13	48	24	80	27	40	27	40	12	24	104	240
281	-	-	-	-	3	4	2	6	9	18	9	18	22	44	45	90
Total	47	54	61	52	198	360	254	558	102	202	191	326	192	382	1,045	1,934

Table A-30.--Numbers of Piute sculpin caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
153	-	-	3	4	-	-	1	2	-	-	-	-	-	-	4	6
161	-	-	16	8	-	-	14	18	-	-	1	2	-	-	31	28
169	-	-	4	2	-	-	-	-	3	6	-	-	-	-	7	8
177	-	-	1	2	-	-	13	30	24	42	5	8	-	-	43	82
185	-	-	2	6	-	-	8	16	6	16	1	2	-	-	17	40
193	-	-	-	-	-	-	17	48	-	-	17	36	9	26	43	110
201	-	-	7	8	1	4	9	22	8	30	3	6	-	-	28	70
209	-	-	-	-	19	28	-	-	5	18	11	20	8	14	43	80
217	-	-	1	0	7	10	2	4	1	2	2	4	-	-	13	20
225	2	4	1	2	-	-	-	-	-	-	-	-	-	-	3	6
233	-	-	8	8	-	-	10	28	7	18	3	6	2	2	30	62
241	2	2	3	4	-	-	5	12	6	16	4	6	3	6	23	46
250	-	-	6	6	2	4	2	4	-	-	3	4	3	8	16	26
258	4	6	8	12	-	-	1	2	-	-	4	6	3	6	20	32
266	2	4	2	2	-	-	3	4	-	-	1	2	2	6	10	18
274	4	6	14	10	-	-	11	36	19	32	40	60	6	12	94	156
281	-	-	-	-	-	-	11	28	9	18	-	-	7	14	27	60
Total	14	22	76	74	29	46	107	254	88	198	95	162	43	94	452	850

Table A 31.--Numbers of torrent sculpin caught and CPUE (catch per unit of effort), main stem of the Yakima River, 1957-58

Distance upstream from river mouth	April 8-June 20		July 15-Aug. 7		Sept. 18-Oct. 18		Nov. 12-22		Jan. 1-21		Mar. 3-21		May 12-20		Total	
Km.	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE	No.	CPUE
113	-	-	-	-	2	4	-	-	-	-	-	-	-	-	2	4
137	2	2	2	2	-	-	1	2	-	-	1	2	-	-	6	8
145	1	0	6	8	-	-	3	4	-	-	3	6	-	-	13	18
153	15	12	9	12	6	10	9	26	1	2	2	2	-	-	42	64
161	31	20	35	20	44	30	45	60	25	36	16	20	1	2	197	178
169	18	16	6	4	2	4	2	4	33	66	4	8	1	2	66	104
177	42	42	-	-	29	52	73	166	37	64	14	22	-	-	195	346
185	19	14	37	92	66	66	27	52	8	20	2	4	5	12	164	260
193	5	4	3	2	38	96	-	-	-	-	14	30	32	88	92	220
201	26	22	56	60	5	20	11	28	3	12	6	10	9	24	116	176
209	28	22	38	22	40	68	2	6	5	18	4	8	7	12	124	146
217	-	-	5	4	32	42	37	64	6	10	4	8	2	6	86	134
225	20	36	14	14	27	42	-	-	5	12	19	28	6	12	91	144
233	23	28	32	28	26	44	7	20	7	18	15	32	17	20	127	190
241	28	20	10	12	25	26	-	-	10	28	3	6	-	-	76	92
250	-	-	11	12	6	10	13	30	14	22	33	48	24	64	101	186
258	7	12	-	-	9	26	5	12	-	-	7	10	15	28	43	88
266	16	30	21	24	2	4	19	28	23	28	35	44	9	26	125	184
274	15	24	65	46	19	24	9	30	10	16	13	20	10	20	141	180
281	-	-	1	2	6	10	18	46	12	24	27	56	28	56	92	194
Total	296	304	351	364	384	568	281	578	199	366	222	364	166	372	1,899	2,916

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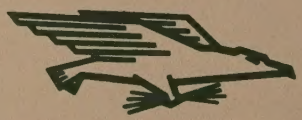

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